Chapter 5: References

BIBLIOGRAPHY

Acosta, C.A. and S.A. Perry

2002 Spatially explicit population responses of crayfish Procambus alleni to potential shifts in vegetation distribution in the marl marshes of Everglades National Park, U.S.A. H*ydrobiologia* 477: 221-230.

Beissinger, S.R.

1988. Snail kite. Pages 148-165 in R. S. Palmer, eds. Handbook of North American birds, vol. 4, Yale University Press, New Haven, Connecticut.

Bennetts, R. E., M. W. Collopy, and J. A. Rodgers, Jr.

1994. The snail kite in the Florida Everglades: a food specialist in a changing environment. Pages 507-532 in J. Ogden and S. Davis, eds. Everglades: the ecosystem and its restoration, St. Lucie Press; Delray Beach, Florida.

Bennetts, R.E. and W.M. Kitchens

1997 The Demography and Movements of Snail Kites in Florida. Florida Cooperative Fish and Wildlife Research Unit, National Biological Service, U.S. Department of the Interior, Gainesville, FL.

Brenner, J. and D. Wade

2003 *Florida's Revised Prescribed Fire Law: Protection for Responsible Burners*. Available on the Internet <http://www.srs.fs.usda.gov/pubs/ja/uncaptured/ja_brenner001.pdf>.

Browder, J.A.

1984. Wood Stork feeding areas in southwest Florida. Florida Field Naturalist. 12:81-96.

Brown, R.B., E.L. Stone, and V.W. Carlisle

1990 *Ecosystems of Florida*. Myers, Ronald L., and John J. Ewel, eds. University of Central Florida Press, Orlando.

Bryan, A.L., Jr. and M.C. Coulter

1987 Foraging flight characteristics of Wood Storks in East-Central Georgia, U.S.A. Colonial Waterbirds 10:157-161.

Comprehensive Everglades Restoration Plan

2008 *2007-2008 Update*. Available on the Internet at <http://www.evergladesplan.org/pm/pm_docs/cerp_2008_rpt_to_public.pdf>.

2009a Information extracted from "*CERP: The Plan in Depth*." Available on the Internet at <http://www.evergladesplan.org/about/rest_plan_pt_01.aspx>.

2009b Information extracted from "*Corps Awards Tamiami Trail Contract*." Available on the Internet at http://www.evergladesplan.org/news/features/092909_tamiami_contract.aspx.

2009c Information extracted from "*Development of the Central & South Florida (C&SF) Project*." Available on the Internet at **<http://www.evergladesplan.org/about/restudy_csf_devel.aspx>**.

2009d Information extracted from "*Everglades: a Brief History*." Available on the Internet at <http://www.evergladesplan.org/about/learn_everglades.aspx>.

Coulter, M.C.

1987 Foraging and breeding ecology of Wood Storks in east-central GA. Pp. 21-27. In Proceedings of the Third Southeastern Nongame and Endangered Wildlife Symposium (R.R. Odum, K.A. Riddleberger, and J. Ozier, eds.). Georgia Department of Natural Resources.

Coulter, M.C. and A.L. Bryan, Jr.

1993 Foraging ecology of Wood Storks in east-central Georgia. 1. Characteristics of foraging sites. Colonial Waterbirds 16:59-70.

Coulter, M.C., J.A. Rodgers, J.C. Ogden, and F.C. Depkin

1999 Wood stork (Mycteria americana). In: The Birds of North America, No. 409 9A. Poole and F. Gill, eds. The Birds of North America, Incorporated; Philadelphia, Pennsylvania.

Council on Environmental Quality

1978 "*Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.*" *Code of Federal Regulations*, Title 40, Parts 1500-1508.

1997 *Environmental Justice Guidance under the National Environmental Policy Act.* Washington, D.C.: Executive Office of the President. Available on the Internet at <http://www.epa.gov/compliance/resources/policies/ej/ej_guidance_nepa_ceq1297.pdf>.

Crozier, G.E. and M.I. Cook

2004 South Florida Wading Bird Report, Volume 10. Unpublished report, South Florida Water Management District. November 2004.

Dean, T.F. and J.L. Morrison

1998 Non-breeding season ecology of the Cape Sable seaside sparrow (Ammodramus maritimus mirabilis): 1997-1998 field season final report. Unpublished report submitted to the U.S. Fish and Wildlife Service.

Dees, C.S., J.D. Clark, and F.T. van Manen

1999 Florida panther habitat use in response to prescribed fire at Florida Panther National Wildlife Refuge and Big Cypress National Preserve. Final report to Florida Panther National Wildlife Refuge. University of Tennessee, Knoxville, TN.

Drietz, V.J., J.D. Nichols, J.E. Hines, R.E. Bennetts, W.M. Kitchens, and D.E. DeAngelis

2002 The use of resighting data to estimate the rate of population growth of the snail kite in Florida. Journal of Applied Statistics 29(4) 609-623.

Elisens, W.J. and J.M. Jones

2009 Sideroxylon reclinatum subsp. austrofloridense In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford. Vol. 8, page 242.

ENP Fire Management Program

No date. Pineland croton: fire effects monitoring. Unpublished report in files of Fire Management program, Everglades National Park. 13 pages.

Epanchin, P.N., J.A. Heath, and P.C. Frederick

2002 Effects of Fires on Foraging and Breeding Wading Birds in the Everglades. The Wilson Bulletin 114(1): 139-141.

Ewel, K. C.

1990 *Swamps.* From: Ecosystems of Florida, R.L. Myers and J.J. Ewel, eds. University of Central Florida Press, Orlando.

Federal Land Managers' Air Quality Related Values Workgroup

2008 Federal Land Managers' Air Quality Related Values Workgroup. Phase I report-Revised, July Draft. Available on the Internet at <http://www.nature.nps.gov/air/permits/flag/docs/FLAG_RevisedFinalDraft20080624.pdf>.

Ferster, B. and Z. Prusak

1994 A preliminary checklist of the ants (Hymenoptera: Formicidae) of Everglades National Park. Florida Entomologist 77: 508-512.

Florida Fish and Wildlife Conservation Commission

No date Wild Turkey - Life History and Habitat. Published online at: http://myfwc.com/media/460326/Wildl_Turkey_LifeHistory_Habitat.pdf accessed 3/18/2013.

2011a Florida sandhill crane biological status review report. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. 11 pages.

2011b White-crowned pigeon biological status review report. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. 13 pages.

2012 Gopher tortoise management plan, Gopherus polyphemus, September 2012. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. 243 pages.

Florida Natural Areas Inventory

2001 Field Guide to the Rare Animals of Florida. Published online at: http://www.fnai.org/FieldGuide/index.cfm

2010 Field Guide to the Natural Communities of Florida. Published online at: http://www.fnai.org/PDF/NC/Pine_Rockland_Final_2010.pdf

Gann, G.D., K.N. Hines, S. Saha, and K.A. Bradley

2008 Rare Plant Monitoring and Restoration on Long Pine Key, Everglades National Park. Final Report submitted to Everglades National Park. The Institute for Regional Conservation. Miami, Florida. 66 pages.

Gawlik, D.E.

2002 The Effects of Prey Availability on the Numerical Response of Wading Birds. Ecological Monographs, Vol. 72, No. 3, pp. 329-346

Green, S.E., K.A. Bradley, and S.W. Woodmansee

2007a Status survey of the Federally threatened Chamaesyce garberi in South Florida, Quarterly report 2. Report to the U.S. Fish and Wildlife Service. The Institute for Regional Conservation, Miami, Florida. 8 pages.

2007b Status survey of the Federally threatened Chamaesyce garberi in South Florida, Quarterly report 3. Report to the U.S. Fish and Wildlife Service. The Institute for Regional Conservation, Miami, Florida. 4 pages.

Government Printing Office (GPO)

2001 *Federal Register* / Vol. 66, No. 160 / Friday, August 17, 2001 / Notices). Available on the internet at: http://www.gpo.gov/fdsys/pkg/FR-2001-08-17/html/01-20592.htm

Griffin, John W.

1988 The Archaeology of Everglades National Park: A Synthesis. Southeast Archaeological Center, National Park Service, Tallahassee.

Gunderson, Lance H., and William F. Loftus

1993 The Everglades. In *Biodiversity of the Southeastern United States: Lowland.* John Wiley and Sons, Inc.

Hallac, D., J. Kline, J. Sadle, S. Bass, T. Ziegler, and S. Snow

2010 Preliminary effects of the January 2010 cold weather on flora and fauna in Everglades National Park. Unpublished report dated February 2, 2010, South Florida Natural Resources Center, Everglades National Park, Homestead, Florida. 8 pages.

Hennessey, M.K. and D.H. Habeck

1991 Effects of mosquito adulticides on populations of non-target terrestrial arthropods in the Florida Keys. Final Report and Research Results submitted to U.S Fish and Wildlife Service. University of Florida Cooperative Wildlife Research Unit, Gainesville, FL. 75 pages.

Herndon, A.

1998 Life history studies of some plants endemic to pine rockland in Everglades National Park. Final Report to National Park Service, Everglades National Park, Homestead, Florida. 142 pages.

Hillis, D. M.

1995 Genetic variation, systematic and reproduction of Florida Tree Snails (Liguus fasciatus). Game and Fresh Water Fish Commission, Nongame Wildlife Program Project Report. 25pp +viii. Tallahassee, Fl.

Humphrey, S.R.

1992 Southern Florida population of mink Mustela vison mink (in part). Pages 319-327 in S.R. Humphrey (ed.), Rare and endangered biota of Florida. Vol. I. Mammals. University Press of Florida. Gainesville, Florida.

Hylton, R.A., P.C. Frederick, T.E. De La Fuente, and M.G. Spalding.

2006 Effects of nestling health on postfledging survival of wood storks. Condor 108:97-106.

Interagency Aviation Management Council

2006 *Interagency Helicopter Operations Guide*. Boise ID: U.S. Department of the Interior and U.S. Forest Service, Department of Agriculture. National Fire Educational Series Publication No. 1885. Available on the Internet at <http://www.nifc.gov/ihog/>.

Intergovernmental Panel on Climate Change (IPCC)

2009 Intergovernmental Panel on Climate Change Website. Available on the Internet at: http://www.ipcc.ch/

Kahl, M.P., Jr.

1964 Food ecology of the Wood Stork (Mycteria americana). Ecological Monographs 34:97-117.

Kilgore, B.

1976 "From fire control to fire management: an ecological basis for policies." *North American Wildlife and Natural Resources Conference Transactions* 41:477-493. Cited in Taylor, Dale L, 1981, *Fire History and Fire Records for Everglades National Park, 1948-1979*. South Florida Research Center Report T-619.

Kitchens, W.M., Bennetts, R.E., and D.L. DeAngelis.

2002. Linkage between the snail kite population and wetland dynamics in a highly fragmented south Florida hydroscape. In Porter, J.W., and K.G. Porter (eds). The Everglades, Florida Bay, and Coral Reefs of the Florida Keys: An Ecosystem Sourcebook. CRC Press, Boca Raton, FL.

Kushlan, J.A.

1988 Conservation and management of the American crocodile. Environmental Management 12(6): 777-790.

1990 Freshwater marshes. In *Ecosystems of Florida*. Myers, Ronald L., and John J. Ewel, eds. University of Central Florida Press, Orlando.

Kushlan, J.A. and F.J. Mazzotti

1989a Historic and present distribution of the American crocodile in Florida. Journal of Herpetology 23(1):1-7.

Kushlan, J. A. and Frohring, P. C.

1986 The history of the southern Florida Wood Stork population. Wilson Bulletin. 98: 368-386.

Land, E.D. and R.C. Lacy

2000 Introgression level achieved through Florida panther genetic restoration. Endangered Species Update 17:99-103.

Landres, P., M.B. Hennessy, K. Schlenker, D.N. Cole, and S. Boutcher

2008 Applying the Concept of Wilderness Character to National Forest Planning, Monitoring, and Management. Fort Collins, CO: General Technical Report RMRS-GTR-217WWW. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

La Puma, D.A., J.L. Lockwood, and M.J. Davis

2007 Endangered species management requires a new look at the benefit of fire: The Cape Sable seaside sparrow in the Everglades ecosystem. Biological Conservation 136: 398-407.

LeBuff, C.R.

1957 The range of Crocodylus acutus along the Florida Gulf Coast. Herpetologica 13: 188.

Lenczewski, B.

1980 Butterflies of Everglades National Park. Report T-588, South Florida Research Center, Everglades National Park. U.S. Department of the Interior.

Lloyd, J.D. and G.L. Slater

2011 Influence of Fire and Water Regimes on Pineland Bird Assemblages. *Natural Areas Journal* 31: 270-282.

Lockwood, J.L., K.H. Fenn, J.L. Curnutt, D. Rosenthal, K.L. Balent, and A.L. Mayer

1997 Life History of the Endangered Cape Sable Seaside Sparrow. *Wilson Bulletin* 109(4): 720-731.

Lockwood, J.L., K.H. Fenn, J.M. Caudill, D. Okines, O.L. Bass, Jr., J.R. Duncan, and S.L. Pimm

2001 The implications of Cape Sable seaside sparrow demography for Everglades restoration. Animal Conservation 4:275-281.

Lockwood, J.L., M.S. Ross, and J.P. Sah

2003 Smoke on the water: the interplay of fire and 41 water flow on Everglades restoration. Frontiers in Ecology 1(9): 462-468.

Lockwood, J.L., D.A. LaPuma, and M.J. Davis

2005 The response of the Cape Sable seaside sparrow to fire. 2005 Annual Report. Unpublished Report to the Critical Ecosystem Studies initiative, Everglades National Park, Homestead, Florida.

Lockwood, J.L., D.A. La Puma, B. Baiser, M. Boulton, and M.J. Davis

2006 Detailed study of Cape Sable seaside sparrow nest success and causes of nest failure. 2006 annual report to U.S. Fish and Wildlife Service, Vero Beach, Florida.

Loehman, R. and G. Anderson

2009 Understanding the Science of Climate Change Talking Points: Impacts to Western Mountains and Forests. Natural Resource Program Center, National Park Service, Fort Collins, CO.

Lorenz, J.J., B Langan-Mulrooney, P.E. Frezza, R.G. Harvey, and F. J. Mazzotti

2009 Roseate spoonbill reproduction as an indicator for restoration of the Everglades and the Everglades estuaries. *Ecological Indicators* 98: S96-S107.

Maehr, D.S., R. C. Belden, E. D. Land, and L. Wilkins

1990 Food habits of panthers in southwest Florida. Journal of Wildlife Management 54: 420-423.

Maehr, D.S. and J.L. Larkin

2004 Do prescribed fires in south Florida reduce habitat quality for native carnivores? Natural Areas Journal 24:188-197.

Martin, J., W. Kitchens, C. Catau, A. Bowling, M. Conners, D. Huser, and E. Powers

2006 Snail kite demography report, 2005. Unpublished report to the U.S. Fish and Wildlife Service, Vero Beach, Florida.

Mazzotti, F.

1983 The Ecology of Crocodylus acutus in Florida. Ph.D. Dissertation. The Pennsylvania State University, University Park, Pennsylvania. 161 pages.

Mazzotti, F.J., M.S. Cherkiss, G.S. Cook, and E. McKercher

2002 Status and conservation of the American crocodile in Florida: Recovering an endangered species while restoring an endangered ecosystem. Draft Final Report to the National Park Service, Homestead, FL. 51 pages.

McMahon and deCalesta

1990 Effects of fire on fish and wildlife. In: Walstad,John D.;Radosevich,Steven R.;Sandberg,David V. *Natural and prescribed fire in Pacific Northwest forests.* Corvallis,OR: Oregon State University Press: 233-250.

McMahon C.K. and P.G. Bush

1991 *No Herbicide Residues Found in Smoke from Prescribed Fires.* Technology Update, United States Department of Agriculture, Forest Service. Management Bulletin R8-MB 56. Available on the Internet <http://www.srs.fs.usda.gov/pubs/misc/r8_mb056.pdf>.

Meshaka Jr., Walter E., William F. Loftus, and Todd Steiner

2000 The herpetofauna of Everglades National Park. *Florida Scientist* 63 (2): 84-103. Available on the Internet <http://www.nps.gov/ever/naturescience/reptiles.htm>.

Meyer, K.D. and P.C. Frederick

2004 Survey of Florida's Wood Stork (Mycteria Americana) Nesting Colonies, 2004. Final Report to U.S. Fish and Wildlife Service, Atlanta, GA.

Miami-Dade County

2009 *Climate Change*. Miami-Dade County Website. Available on the Internet at: http://miamidade.gove/derm/climate_change.asp

Miami-Dade County Climate Change Advisory Task Force (CCATF)

2008 *Second Report and Initial Recommendations.* Presented to the Miami-Dade Board of County Commissioners. Available at http://www.miamidade.gov/derm/library/08-10-04_CCATF_BCC_Package.pdf

Miller, R.L., B.F. McPherson, R. Sobczak, and C. Clark

2004 Water Quality in Big Cypress National Preserve and Everglades National Park – Trends and Spatial Characteristics of Selected Constituents. Water Resources Investigations Report 03-4249. U.S. Department of the Interior, U.S. Geological Survey.

Moler, P.E.

1991 American Crocodile Population Dynamics. Study number 7532, Bureau of Wildlife Research, Florida Game and Fresh Water Fish Commission, Tallahassee, FL. 42 pages.

Mutch, Robert W. and Wayne A. Cook

1996 "Restoring fire to ecosystems: methods vary with land management goals." Ogden, UT: In: Hardy, C. C. and S.F. Arno, eds. *The Use of Fire in Forest Restoration.* General Technical Report INT-GTR-341, U.S. Department of Agriculture, Forest Service, Intermountain Research Station. Available on the Internet at <http://www.fs.fed.us/rm/pubs_int/int_gtr341/int_gtr341_009_011.pdf.>

Myers, R. L.

2000 *Fire in Tropical and Subtropical Ecosystems. From: Wildland Fire in Ecosystems: Effects of Fire on Flora*, J.K. Brown and J.K. Smith, eds. United States Department of Agricultur, Forest Service, Rocky Mountain Research Station. General Technical Report RMRS-GTR-42 Volume 2, December 2000.

National Interagency Fire Center

2014 *Interagency Standards for Fire and Fire Aviation Operations (Red Book 2014)*. Available on the Internet at <http://www.nifc.gov/policies/red_book.htm>.

2012 *Interagency Standards for Fire and Fire Aviation Operations (Red Book 2012)*. Available on the Internet at http://www.nifc.gov/policies/pol_ref_redbook_2012.html>.

National Park Service (NPS)

1979 *Everglades National Park Master Plan.* Homestead, FL. Available on the Internet at <http://www.nps.gov/ever/parkmgmt/upload/1979%20EVER%20Master%20Plan.PDF>.

1986 "Historic Resource Study for Everglades National Park," by John C. Paige, NPS Denver Service center, Denver, Colorado.

1991a *Everglades National Park Fire Management Plan and Environmental Assessment.* Homestead, FL: unpublished document on file at Everglades National Park.

1991b NPS-18, Wildland Fire Management Guideline. Boise. ID: Boise Interagency Fire Center

1994 *Everglades National Park Fire Management Plan and Environmental Assessment Yearly Update*. Everglades National Park. 1994.

1996 "Archeological Resources of Everglades National Park." National Register of Historic Places Multiple Property Nomination: [Bear Lake Mounds Archeological District; Monroe Lake Archeological District; Shark River Slough Archeological District; Ten Thousand Islands Archeological District; Anhinga Trail Archeological District; Cane Patch Site; Rookery Mound Site]," by Margo Schwadron, NPS Southeast Archeological Center, Tallahassee, Florida.

1998a *Director's Order #28: Cultural Resource Management.* [Washington, D.C.]. Available on the Internet at http://www.nps.gov/policy/dOrders/DOrder28.html>.

1998b Hole-in-the-Donut Soil Disposal Environmental Assessment, Everglades National Park, Florida. August 1998.

1998c *NPS-28, Cultural Resource Management Guideline.* Washington, D.C.: National Park Service.

1998d "Cold War-Era Cultural Resources in South Florida, Nike Missile Site HM-69, Everglades National Park," by Jennifer B. Leynes, NPS Southeast Support Office, Atlanta, Georgia.

2000a "Ingraham Highway Historic District, Everglades NP" (draft National register of Historic Places Registration form), by Christine Trebellas, NPS Southeast Regional Office, Atlanta, Georgia.

2000b "Mission 66 Visitor Centers, The History of a Building Type," by Sarah Allaback, Ph.D., NPS Cultural Resources and Stewardship and Partnerships, Park Historic Structures and Cultural Landscapes Program, Washington, D.C.

2001a *Director's Order #12 Handbook.* [Washington, D.C.]. Available on the Internet at <http://home.nps.gov/applications/npspolicy/DOrders.cfm>.

2001b *Everglades National Park Strategic Plan 2001 – 2005.* Homestead FL. Available on the Internet at http://www.nps.gov/ever/parkmgmt/upload/everstrategicplan.pdf.

2001c Scenic Corridor Study for the Flamingo Wastewater Treatment Plan, Big Cypress National Preserve, Florida.

2002a Research Proposal for Archaeological Inventory and Assessment of the Eastern Everglades Expansion Lands, Everglades National Park, FL (August 25, 2002). Southeast Archaeological Center, National Park Service, Tallahassee.

2002b *Director's Order #77-1: Wetland Protection.* Available on the Internet at http://www.nps.gov/applications/npspolicy/DOrders.cfm>

2003a *Director's Order #77-2: Floodplain Management.* [Washington, D.C.] Available on the Internet at <http://home.nps.gov/applications/npspolicy/DOrders.cfm>.

2003b Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center.

2003c "Nike Missile Site HM-69, Everglades NP" (draft National register of Historic Places Registration form), by Diana E. Welling and Jennifer Dickey, NPS Southeast Regional Office, Atlanta, Georgia.

2004a *Procedural Manual 77-2: Floodplain Management.* [Washington, D.C.] Available on the Internet at <http://home.nps.gov/applications/npspolicy/DOrders.cfm>.

2004b “Trip Report – Everglades Camps, December 2004,” by Brian Coffee, NPS Southeast Regional Office, Atlanta, Georgia.

2005a *Fire Management Plan and Environmental Assessment: Big Cypress National Preserve*.

2005b Joint Report to Congress: Everglades Water Quality. Resource Evaluation Report, South Florida Natural Resources Center, Everglades National Park.

2006a *Management Policies 2006*. Washington, D.C.: NPS Office of Policy. Available on the Internet at< http://www.nps.gov/policy/mp2006.pdf>.

2006b *South Florida and Caribbean Parks Draft Exotic Plant Management Plan / Environmental Impact Statement*. Denver, CO: Environmental Quality Division. Available on the Internet at <http://parkplanning.nps.gov/document.cfm?parkId=374&projectId=10033&documentID=16855.>.

2006c “Investigations of Ten Thousand Islands Shell Works Sites for National Historic Landmark Eligibility, Everglades National Park, FL,” by Margo Schwadron, NPS Southeast Archeological Center, Tallahassee, Florida.

2007a. “Archeological Assessment of the Eastern Everglades Expansion Lands, Everglades National Park, FL,” by Margo Schwadron, NPS Southeast Archeological Center, Tallahassee, Florida.

2007b South Florida parks Collections Management Plan, (Big Cypress National Preserve, Biscayne National Park, Dry Tortugas National Park, Everglades National Park).

2008a *Director's Order #18: Wildland Fire Management*. Washington, D.C.: National Park Service. Available on the Internet at <http://www.nps.gov/policy/DOrders/DO-18.html>.

2008b *Wildland Fire Management, Reference Manual 18*. Boise, ID: Branch of Wildland Fire, Division of Fire and Aviation. National Interagency Fire Center. Available on the Internet at <http://www.nps.gov/fire/download/fir_wil_rm18.pdf>.

2008c Flamingo Commercial Services Plan Finding of No Significant Impact. Everglades National Park. July 2008.

2009a “*Everglades National Park: Developing the Everglades*.” Available on the Internet at <http://www.nps.gov/ever/historyculture/development.htm>.

2009b Potential Ecological Consequences of Climate Change in South Florida and the Everglades. 2008 Literature Synthesis. Resource Evaluation Report, South Florida Natural Resource Center Technical Series 2009:1. Homestead, FL.

2009c “A Cultural Resource Assessment of the Old Ingraham Highway and Homestead, East Cape and Buttonwood Canals, Everglades National Park,” by Mance Buttram et al., Melissa Memory(principal investigator), Homestead, Florida.

2011a *Director’s Order #12: Conservation Planning, Environmental Impact Analysis, and Decision Making*. [Washington, D.C.]. Available on the Internet at <http://www.nps.gov/policy/DOrders/DO-12.pdf>.

2011b *Director’s Order #41: Wilderness Preservation and Management*. Washington, DC: NPS Office of Policy. Accessed online at http://data2.itc.nps.gov/npspolicy/DOrders.cfm.

2011c Draft General Management Plan / Environmental Impact Statement for Everglades National Park. Unpublished draft.

2011d *National Park Service Procedural Manual #77-1: Wetland Protection*. Washington, D.C. Available on the Internet at <http://home.nps.gov/applications/npspolicy/DOrders.cfm>.

2011e NPS Stats. National Park Service Public Use Statistics Office. 2011. Available on the internet at: http://www.nature.nps.gov/stats/park.cfm

National Park Service, Advisory Council on Historic Preservation; and the National Council of State Historic Preservation Officers

2008 "Programmatic Memorandum of Agreement among the NPS, Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers." [Washington, D.C.]: Appendix P of *NPS-28: Cultural Resource Management Guideline*. Available on the Internet at <http://www.cr.nps.gov/history/online_books/nps28/28appenp.htm.>

New South Associates

2006 "Cultural Resources Survey, Tamiami Trail, Modified Waters to the Everglades National Park – GRR/SEIS." Report submitted to the U.S. Army Corps of Engineers, Jacksonville District, Florida.

2010 "You Just Can't Live Without It": Ethnographic Study and Evaluation of Traditional Cultural Properties of the Gladesmen Culture, Comprehensive Everglades Restoration Plan (CERP), Southern Florida (Draft). Report submitted to the U.S. Army Corps of Engineers, Jacksonville District, Florida.

Nott, M.P., O.L. Bass, Jr., D.M. Fleming, S.E. Killeffer, N. Fraley, L. Manne, J.L. Curnutt, T.M. Brooks, R. Powell, and S.L. Pimm

1998. Water levels, rapid vegetational changes, and the endangered Cape Sable seaside sparrow. Animal Conservation 1:23-32.

Oberhofer and Bass

2004 Everglades National Park, in *South Florida Wading Bird Report*, G.E. Crozer and M.I. Cook, editors. Vol. 10, November 2004.

Ogden, J.C., J.A. Kushlan, and J.T. Tilmant

1978 The food habits and nesting success of wood storks in Everglades National Park in 1974. U.S. Department of the Interior, National Park Service, Natural Resources Report No. 16.

Ogden, J.C., D.A. McCrimmon, Jr., G.T. Bancroft, and B.W. Patty

1987 Breeding populations of the wood stork in the southeastern United States. Condor. 89:752-759.

Ogden, J.C.

1991 Nesting by wood storks in natural, altered, and artificial wetlands in central and northern Florida. Colonial Waterbirds, volume 14: 39-45.

O'Hare, N.K. and G.H. Dalrymple

1997 Wildlife in Southern Everglades Invaded by Melaleuca (Melaleuca quinquenervia). Bulletin of the Florida Museum of Natural History 1-68. University of Florida; Gainesville, Florida.

Paige, John C.

1986 Historic Resource Study for Everglades National Park. U.S. Department of Interior, National Park Service.

Papadogiannaki, Eleonora, Nancy C. Holmes, Michael A. Schuett, Steven J. Hollenhorst

2008 Everglades National Park Visitor Study Winter and Spring 2008. *Park Studies Unit Visitor Services Project Report 199*. November. Park Studies Unit, University of Idaho.

Available on the internet at:
https://psu.uidaho.edu/files/vsp/reports/199_EVER_rept.pdf

Percival, M.

1974 Floral ecology in coastal scrub of Southeast Jamaica. Biotropica 6(2) 104-129.

Pimm, S.L., J.L. Lockwood, C.N. Jenkins, J.L. Curnutt, M.P. Nott, R.D. Powell, and O.L. Bass, Jr.

2002 Sparrow in the grass: a report on the first 10 years of research on the Cape Sable seaside sparrow (Ammodramus maritimus mirabilis). Unpublished report to Everglades National Park; Homestead, Florida.

Post, W. and J.S. Greenlaw

1994 Seaside sparrow, Ammodramus maritimus. In The Birds of North America, No. 127 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Reichert, B, C. Cattau, W.Kitchens, R.Fletcher, J. olbert, K. Pias, and C. Zweig.

2011 Snail Kite Demography Annual Report 2011. Unpublished report to the U.S. Army Corps of Engineers, Jacksonville, FL. Contract# W912EP-09-C-0023.

Reichert, B., C. Cattau, R. Fletcher, W. Kendall, W. Kitchens

2012 Extreme weather and experience influence reproduction in an endangered bird. Ecology. 2012.

Rice, Kenneth G., J. Hardin Waddle, Marquette E. Crockett, Brian M. Jeffrey, and H. Franklin Percival

2004 Herpetofaunal inventories of the National Parks of South Florida and the Caribbean: Volume I. Everglades National Park. Open-file Report 2004-1065. U.S. Department of the Interior, U.S. Geological Survey.

Robertson, William B., Jr.

1953 *A Survey of the Effects of Fire in Everglades National Park*. Washington, D.C.: U.S. Department of the Interior, National Park Service, Everglades National Park. On file with: U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Fire Sciences Laboratory, Missoula, MT.

Rodgers, J.A., Jr., S.T. Schwikert, and A.S. Wenner

1988 Status of the snail kite in Florida: 1981-1985. American Birds 42:30-35.

1996 Nesting habitat of wood storks in north and central Florida, USA. Colonial Waterbirds 19:1-21.

Ross, M.S., J.P. Sah, P.L. Ruiz, D.T. Jones, H. Cooley, R. Travieso, J.R. Snyder, and D. Hagyari

2006 Effect of hydrologic restoration on habitat of the Cape Sable seaside sparrow – Annual report of 2004-2005. Unpublished report, Southeast Environmental Research Center, Florida International University, Miami, Florida.

Salvato, M.

2001 Butterfly conservation and host plant fluctuations: the relationship between Strymon acis bartrami and Anaea troglodyta floridalis on Croton linearis in Florida (Lepidoptera: Lycaenidae and Nymphalidae). Holarctic Lepidoptera 8(2) 53-57.

Salvato, M.H. and M.K. Hennessey

2003 Notes on the historic range and natural history of Anaea troglodyta floridalis (Nymphalidae). Journal of the Lepidopterists Society. 57(3) 243-249.

Salvato, M.H. and H.L. Salvato

2008 Notes on the feeding ecology of Strymon acis bartrami and Anaea troglodyta floridalis. Florida Scientist. 71: 323-329.

2010 Notes on the status and ecology of Anaea troglodyta floridalis (Nymphalidae) in Everglades National Park. Journal of the Lepidopterist Society (64)2 91-97.

Sandberg, D.V., R.D. Ottmar, J.L. Peterson, and J. Core

2002 Wildland fire on ecosystems: effects of fire on air. Gen. Tech. Rep. RMRS-GTR-42-vol. 5. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Secretary of the Interior, The

1983 *The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.* Washington, D.C.: Available on the Internet at <http://www.cr.nps.gov/local-law/arch_stnds_0.htm>.

1995a *The Secretary of the Interior's Standards for the Treatment of Historic Properties: with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings.* By Kay D. Weeks and Anne E. Grimmer. Washington, D.C.: National Park Service, Preservation Assistance Division, Cultural Resource Stewardship and Partnerships. Available on the Internet at <http://www.nps.gov/hps/tps/standguide/>.

1995b *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.* Washington, D.C.: National Park Service, Historic Landscape Initiative. Available on the Internet at <http://www.nps.gov/tps/standards/four-treatments/landscape-guidelines/index.htm>.

Schlosser, William E., Ph.D.

2005 *Defining the Wildland-Urban Interface: A Logic-Graphical Interpretation.* Northwest Management, Inc., Moscow ID. Accessed at http://www.idl.idaho.gov/nat_fire_plan/county_wui_plans/ada/defining-the-wui-low-res.pdf

Schweitzer, D.F., M.C. Minno, and D.L. Wagner

2011 Rare, Declining and Poorly Known Butterflies and Moths (Lepidoptera) of Forests and Woodlands in the Eastern United States. United States Department of Agriculture. Forest Health Technology Enterprise Team, Publication Number FHTET-2011-01. 517 pages.

Slater

2001 Avian Restoration in Everglades National Park (1997 – 2001): Translocation Menthodogy, Population Demography, and Evaluating Success. Final Report. December 2001.

2004 Avian Restoration in Everglades National Park. An Evaluation of the Brown-Headed Nuthatch and Eastern Bluebird Reintroduction Program During the 2-year Post-Translocation period (2002 – 2003). Final Report. February 2004.

Smith, Andrew T.

1980 An Environmental Study of Everglades Mink (*Mustela vision*). Report T-555, South Florida Research Center, Everglades National Park.

Snyder, J.R.

2003 Clipping as a substitute for fire to study seasonal fire effects on muhly grass (Muhlenbergia capillaris var. filipes). Pages 203-204 in U.S. Geological Survey Greater Everglades Science Program: 2002 Biennial Report. U.S. Geological Survey Open File Report 03-54. Tallahassee, Florida.

Snyder, J.R. and C. Schaeffer

2004 Response of muhly grass to different seasons of prescribed fire in southern Florida. Poster presentation, First National Conference on Ecosystem Restoration. December 6-10, 2004. Orlando, Florida.

Snyder, N.F.R., S.R. Beissinger, and R. Chandler

1989 Reproduction and demography of the Florida Everglades (Snail) Kite. Condor 91:300-316.

Stevens, J.T. and B. Beckage

2010 Fire effects on the demography of the invasive shrub Brazilian pepper (Schinus terebinthifolius) in Florida pine savannas. Natural Areas Journal 30(1) 53-63.

Steward, K.K. and W.H. Ornes

1975 The autecology of sawgrass in the Florida Everglades. Ecology 56:162-171.

Stocker, Randall and Karen V.S. Hupp

2008 "Chapter 6: Fire and Nonnative Invasive Plants in the Southeast Bioregion." In *Wildland Fire in Ecosystems: Fire and Nonnative Invasive Plants*, edited by Kristin Zouhar, Jane Kapler Smith, Steve Sutherland, and Matthew L. Brooks, 91-112. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, General Technical Report 42, Volume 6, RMRS-GTR-42. Available on the Internet at <http://www.fs.fed.us/rm/pubs/rmrs_gtr042_6.html>.

Sturdevant, Jay T.

2009 *Experimental study of local fire conditions and effects on surface or near-surface archeological resources at National Park Service units – Midwest Region.* NPS Midwest Archeological Center, Lincoln Nebraska.

Sykes, P.W., Jr.

1979 Status of the Everglade Kite in Florida.1968-1978. Wilson Bulletin 91:495-511.

1984 The range of the snail kite and its history in Florida. Bulletin, Florida State Museum, Biological Sciences 29:211-264.

1987a The feeding habits of the snail kite in Florida, USA. Colonial Waterbirds 10:84-92.

1987b Some aspects of the breeding biology of the snail kite in Florida. Journal Field Ornithology 58:171-189.

1987c Snail kite nesting ecology in Florida. Florida Field Naturalist 15:57-84.

Sykes, P.W., Jr., J.A. Rodgers, Jr., and R.E. Bennetts

1995 Snail kite (*Rostrhamus sociabilis*) in A. Poole and F. Gill, eds. The birds of North America, Number 171, The Academy of Natural Sciences, Philadelphia, and the American Ornithologists Union; Washington, D.C.

Taylor, Dale L.

1981 *Fire History and Fire Records for Everglades National Park, 1948-1979*. South Florida Research Center Report T-619. Available on the Internet at <http://fulltext10.fcla.edu/cgi/t/text/text-idx?c=feol&idno=FI06198728&format=pdf>.

1983 The seaside sparrow, its biology and management. Pages 147-152 in T.L. Quay et al., eds., Occasional papers of the North Carolina Biological Survey. North Carolina State Museum; Raleigh, North Carolina.

Taylor, D.L. and A. Herndon

1981 Impact of 22 years of fire on understory hardwood shrubs in slash pine communities within Everglades National Park. Report T-640, South Florida Research Center, Everglades National Park, Homestead, Florida. 30 pages.

U.S. Department of the Interior (USDI)

1989a Greater Yellowstone Postfire Assessment. Fire Management Policy Review Team Report, Special Directive 89-7.

1989b Interagency Wildfire Task Force Guidelines. Washington, D.C.

1998 *Departmental Manual*, Part 620 DM, Chapter 1, Wildland Fire Management: General Policy and Procedures. Washington, D.C. Available on the Internet at <http://206.131.241.18/app_DM/act_getfiles.cfm?relnum=3203>.

U.S. Department of the Interior and U.S. Department of Agriculture and (USDI and USDA)

2000 *Managing the Impact of Wildfires on communities and the Environment*, *A Report to the President in Response to the Wildfires of 2000*.

2009 *Guidance for Implementation of Federal Wildland Fire Management Policy*. Prepared by the Chair, Fire Executive Council. Available on the Internet at <http://www.nifc.gov/policies/guidance/GIFWFMP.pdf >.

U.S. Department of the Interior, U.S. Department of Agriculture, Department of Energy, Department of Defense, Department of Commerce, U.S. Environmental Protection Agency, Federal Emergency Management Agency, and National Association of State Foresters (USDI et al.)

2014 Review and Update of the 1995 Federal Wildland Fire Management Policy. Boise, ID: Bureau of Land Management Office of Fire and Aviation, National Interagency Fire Center. Available on the Internet at <http://www.nifc.gov/fire_policy/history/index.htm>.

U.S. Environmental Protection Agency (USEPA)

1998 *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses*. Available on the Internet at <http://www.epa.gov/compliance/resources/policies/ej/ej_guidance_nepa_epa0498.pdf>.

2008 Revisions to Lead Ambient Air Monitoring Requirements. *Fact Sheet*. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Available on the Internet at <http://www.epa.gov/oaqps001/lead/pdfs/Leadmonitoring_FS.pdf>.

2009a Air Quality Index. A guide to Air Quality and Your Health. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. EPA456/F-09-002. August.

2009b Technical Assistance Document for the Reporting of Daily Air Quality – the Air Quality Index (AQI). U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. EPA-454/B-09-001. February.

2010 *Air Quality Criteria*. Available on the Internet at <http://www.epa.gov/air/criteria.html>.

U.S. Fish and Wildlife Service (USFWS)

1982 Eastern indigo snake recovery plan. U.S. Fish and Wildlife Service, Atlanta, Georgia. 23 pages.

1984 Endangered and threatened wildlife and plants; U.S. breeding population of the wood stork determined to be endangered. Federal Register 49:7332-7335.

1994 Final environmental assessment – genetic restoration of the Florida panther; Atlanta, Georgia. 112 pages.

1997 Revised recovery plan for the US breeding population of the wood stork. United States Fish and Wildlife Service, Southeastern Region, Atlanta, Georgia. 76 pages.

1999a Garber's Spurge (Chamaesyce garberi) species profile in Multi-species recovery plan for South Florida. U.S. Fish and Wildlife Service, Atlanta, Georgia. 12 pages.

1999c Eastern indigo snake (Drymarchon corais couperi) species profile in Multi-species recovery plan for South Florida. U.S. Fish and Wildlife Service, Atlanta, Georgia. 16 pages.

1999d Cape Sable seaside sparrow (Ammodromus maritimus mirabilis) species profile in Multi-species recovery plan for South Florida. U.S. Fish and Wildlife Service, Atlanta, Georgia. 26 pages.

2002 Endangered and Threatened Wildlife and Plants; 12-month Finding for a Petition to List the Big Cypress Fox Squirrel. Federal Register 67(37): 8499-8503.

2007 West Indian manatee (Trichecus manatus) 5 year review: Summary and analysis. USFWS Southeastern Region, Ecological Field Service Office, Jacksonville, Florida. 86 pages.

2009. Eastern Indigo Snake Recovery Action Plan. Jackson, Mississippi Ecological Services Office. 4 pages.

2011a Blodgett's silverbush (Argythamnia blodgettii) candidate species assessment dated current as of 6/15/2010. U.S. Fish and Wildlife Service, South Florida Ecological Field Services Office, Vero Beach, Florida. 19 pages.

2011b Florida pineland crabgrass (Digitaria pauciflora) candidate species assessment dated current as of 6/15/2010. U.S. Fish and Wildlife Service, South Florida Ecological Field Services Office, Vero Beach, Florida. 18 pages.

2012a Florida leafwing butterfly (Anaea troglodyta floridalis) candidate species assessment dated current as of 5/27/2010. U.S. Fish and Wildlife Service, South Florida Ecological Field Services Office, Vero Beach, Florida.

2012b Bartram's hairstreak butterfly (Strymon acis bartrami) candidate species assessment dated current as of 6/15/2010. U.S. Fish and Wildlife Service, South Florida Ecological Field Services Office, Vero Beach, Florida. 33 pages.

U.S. Fish and Wildldife Service

2014 Endangered and Threatened Wildlife and Plants; Endangered Status for the Florida Leafwing and Bartram's Scrub-Hairstreak Butterflies. Final Rule. Docket no. FWS-R4-ES-2013-0084. Federal Register Volume 79, No. 155, August 12, 2014, pgs 47180-47220, 47222-47244. Available online at www.federalregister.govEndangered and Threatened Wildlife and Plants; Endangered Status for the Florida Leafwing and Bartram's Scrub-Hairstreak Butterflies. Final Rule. Docket no. FWS-R4-ES-2013-0084. Federal Register Volume 79, No. 155 pgs 47180-47220, 47222-47244. Available online at www.federalregister.gov

U.S. Forest Service (USFS)

1990 *Bob Marshall Wilderness Complex, Guidebook on Prescribed Natural Fire.* U.S. Department of Agriculture.

2000 *Protecting People and Sustaining Resources in Fire-Adapted Ecosystems – A Cohesive Strategy*. Washington, D.C.: The Forest Service Management Response to the General Accounting Office Report GAO/RCED-99-65. Submitted by Lyle Laverty, Regional Forester, Rocky Mountain Region; and Jerry Williams, Director, Fire Management, Northern Region. Available on the Internet at <http://www.fs.fed.us/r4/fires/strategy.pdf>.

Van Lent, T.R. Johnson, and R. Fennema

1993 Water Management in Taylor Slough and Effects on Florida Bay. South Florida Research Center, Everglades National Park.

Wade, D., J. Ewel, and R. Hofstetter

1980 *Fire in South Florida Ecosystems.* Gen. Tech. Rep. SE-17. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station.

Wanless, Hal and B. Vlaswinkel

2005 Coastal Landscape and Channel Evolution Affecting Critical Habitats at Cape Sable, Everglades National Park, Florida.

Werner, H.W.

1975 The biology of the Cape Sable sparrow. Unpublished report prepared for the U.S. Fish and Wildlife Service. U.S. Department of the Interior, Everglades National Park; Homestead, Florida.

Werner, H.W. and G.E. Woolfenden

1983 The Cape Sable sparrow: its habitat, habits, and history. Pages 55-75 in T.L. Quay, J.B. Funderburg Jr., D.S. Lee, E.F. Potter, and C.S. Robbins, eds. The seaside sparrow, its biology and management. North Carolina Biological Survey and North Carolina State Museum; Raleigh, North Carolina.

Wheeler, Ph.D. Ryan J.

2005 "Mud Lake Canal, National Historic Landmark Nomination." Bureau of Archeological Research, Florida Division of Historical Resources, Tallahassee, Florida.

Wildland Fire Leadership Council

2006 *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Implementation Strategy.* Chartered by the Secretaries of Agriculture and Interior in a working collaboration with the offices and representatives of the Governors. Available on the Internet at http://www.forestsandrangelands.gov/plan/documents/10-YearStrategyFinal_Dec2006.pdf>.

Wiss, Janney, Elstner Associates, Inc. and John Milner Associates, Inc.

2011a "Cultural Landscape Inventory for the Flamingo Mission 66 Development Area (draft), Everglades National Park." Copy available at park headquarters.

2011b "Cultural Landscape Inventory for the Nike Missile Site HM-69, Everglades National Park." Copy available at park headquarters.

Wright, Alan L., Edward A. Hanlon, J. Mabry McCray, and David D. Sui

2009 *Persistence of Plant-Available Phosphorus in Muck Soils after Fertilizer Application.* SL 290. Institute of Food and Agricultural Sciences, University of Florida. May 2009.

Wunderlin, R.P. and B.F. Hansen.

2011 Guide to the Vascular Plants of Florida, Third Edition. University Press of Florida, Gainesville. 783 pages.

Zimmerman, G. Thomas and David L. Bunnell

1998 *Wildland and Prescribed Fire Management Policy: Implementation Procedures and Reference Guide.* Boise, ID: National Park Service; U.S. Department of Agriculture, Forest Service; Bureau of Indian Affairs; U.S. Fish and Wildlife Service; and Bureau of Land Management. Available in the Internet at <http://www.fs.fed.us/fire/fireuse/wildland_fire_use/ref_guide/refguide.pdf>.

GLOSSARY

Term	Definition
8.5 Square Mile Area	That portion of unincorporated Miami-Dade County that lies west of the L-31 canal, north of SW 168 Street, and east and of Everglades National Park. This area is within the Mutual Response Zone.
Acres Treated (Prescribed Fire)	The acres within a prescribed fire treatment unit or units in which prescribed fire treatments have been successfully implemented.
Adaptive management	Is a systematic process of continually improving management practices by learning from the outcome of operational programs.
Areas Proposed for Treatment (Prescribed Fire)	The acres within a prescribed fire treatment unit or units in which prescribed fire treatments are planned to be implemented.
Burning Index	An estimate of the potential difficulty of fire containment as it relates to the flame length at the head of the fire.
Cape Sable Seaside Sparrow Working Group	Composed of National Park Service and interagency partners. Meets periodically to provide updates on special status species, state-wide management concerns, share management practices, and discuss lessons learned .
Containment	The status of a wildfire suppression action signifying that a control line was completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire's spread
Contingency resources	Planned and identified fire suppression personnel and equipment that mitigate possible but unlikely events that exceed or are expected to exceed holding resource capabilities.
Controlled	The completion of control line around a fire, any spot fires there from, and any interior islands to be saved; burned out any unburned area adjacent to the fire side of the control lines; and cool down all hot spots that are immediate threats to the control line, until the lines can reasonably be expected to hold under the foreseeable conditions.
Cooperator	Local agency or person who has agreed in advance to perform specified fire control services and has been properly instructed to give such service.
Coordination center	Term used to describe any facility used for the coordination of agency or jurisdictional resources in support of one or more incidents
Dispersion Index	A numerical index from 0 to infinity supplied daily by the National Weather Service that estimates the atmosphere's capacity to distribute particles and gases emitted by a wildland fire.
Duty officer	The staff member who is responsible for assisting in coordination, prioritization, resource mobilization, fire size-up approval and planning. This is not a permanent position and this assignment rotates among staff members.
Escaped fire	Fire, which has exceeded or is expected to exceed initial attack capabilities or prescription.
Extended attack	Suppression activity for a wildfire not contained or controlled by initial attack or contingency forces and for which more firefighting resources are arriving, en route, or being ordered by the initial attack incident commander.
Fire management officer	The Fire Management Officer is responsible for planning, implementation and administration of all dimensions of fire management, including prescribed fire (planned ignitions), wildland fire suppression, wildfire (unplanned ignitions), fire ecology and non-fire fuel reduction. The Fire Management Officer supervises the senior program specialists and is responsible for interagency coordination of the fire program, including participation in South Florida Fire Planning Unit. Fire Management Officer responsibilities are also outlined in the Interagency Standards for Fire and Fire Aviation Operations. This position is supervised by the Deputy Director for Science South Florida Natural Resources Center who has oversight responsibility for the entire program.

Term	Definition
Fire management plan	A plan, which identifies and integrates all wildland fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wildland fires (wildfire and prescribed fire). The plan is supplemented by operational plans, including but not limited to preparedness plans, preplanned dispatch plans, and prevention plans.
Fire management unit (FMU)	A land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, and fuel types, for example, that set it apart from the characteristics of an adjacent FMU. The FMU may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.
Fire planning unit	A Fire Planning Unit consists of one or more FMUs. FPUs may relate to a single administrative unit, a sub-unit, or any combination of units or sub-units. FPUs are scalable and may be contiguous or non-contiguous. FPUs are not predefined by agency administrative unit boundaries, and may relate to one or more agencies.
Fire regime	The frequency, extent, duration, behavior, season, and effects of natural fire that typically would burn in a specified landscape.
Fire return interval	The "normal" time between natural fires for any vegetation type. For grass communities, the fire return interval can be once or more per year. For the interiors of tree islands and hammocks, the fire return interval may be many decades.
Fire return interval departure	The difference between the "natural" fire return interval (in years) for the vegetation type of interest and the years that have elapsed since the last fire in a specified area.
Fire return interval departure index	(The years since last fire minus the natural fire return interval) divided by the natural fire return interval. An index value greater than zero indicates a departure from natural conditions. A value of zero or less indicates the target area is within its natural fire return interval.
Fuel management	Act or practice of controlling flammability and reducing resistance to control of wildland fuels through non-fire, chemical, biological, or manual means, or by fire, in support of land management objectives.
General management plan	A park document that describes broad management goals and objectives for NPS units.
Interagency Standards for Fire and Fire Aviation Operations	A document that provides a reference for current operational policies, procedures, and guidelines for managing wildland fire and fire aviation operations
Keetch-Byram Drought Index	An estimate (0-800) of the amount of precipitation (in 100ths of inches) needed to bring the top 8 inches of soil back to saturation. A value of 0 is complete saturation of the soil, a value of 800 means 8.00 inches of precipitation would be needed for saturation. In the 1988 version of NFDRS, outputs of KBDI are used to adjust live and dead fuel loadings.
Lightning activity level	Part of the National Fire Danger Rating System. A number, on a scale of 1 to 6, which reflects frequency and character of cloud-to-ground lightning (forecasted or observed). The scale for 1 to 5 is exponential, based on powers of 2 (for example, level 3 indicates twice the lightning of level 2).
Miccosukee Strip	A 333-acre area of exclusive jurisdiction immediately south of U.S. Highway 41. This area is occupied by the Miccosukee Tribe of Indians of Florida for residential and administrative purposes. Use of this area by the tribe is through Special Use Permit.
Minimum impact suppression techniques	The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural, and social impacts.
Mutual response zone	A geographical area between two or more jurisdictions into which those agencies would respond on initial attack.
National Fire Danger Rating System	A uniform fire danger rating system that focuses on the environmental factors that control the moisture content of fuels.

Term	Definition
National Fire Plan	A plan prepared by agencies of the U.S. Departments of Agriculture and Interior to reduce adverse effect from unwanted wildland fires.
National Wildfire Coordinating Group	A group formed under the direction of the Secretaries of the Interior and Agriculture to improve the coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend appropriate action, or resolve issues and problems of substantive nature.
Pre-suppression	Activities in advance of fire occurrence to ensure effective suppression action. Includes planning the organization, recruiting, and training, procuring equipment and supplies, maintaining fire equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.
Prevention	Activities directed at reducing the incidence of fires, including public education, law enforcement, personal contact, and reduction of fuel hazards (fuels management).
Resource management plan	Park planning document that describes resource management goals and objectives for NPS units.
Step-up plan	A plan designed to direct incremental preparedness actions in response to increasing fire danger. Those actions are delineated by "staffing classes." Each step-up plan will contain five staffing classes that describe escalations in preparedness activities and staffing. These are approved, predetermined responses to increased fire danger for a burning period, which is defined as that period of the day when fire burns most actively in a given fuel type.
Wildfire	An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.
Wildland fire	Any non-structure fire that occurs in the wildland. Two distinct types of wildland fire are defined, including wildfire and prescribed fire.
Wildland urban interface	These are areas "where wildland vegetation meets urban developments, or where forest fuels meet urban fuels (such as houses). These areas encompass not only the interface (areas immediately adjacent to urban development), but also the continuous slopes and fuels that lead directly to a risk to urban developments" (Schlosser 2005). These areas are a topic of special concern under federal fire policy.

Appendices

APPENDIX A

Federally Listed Species Considered for Analysis in Fire Management Plan EA

[See attached large-format pages]

APPENDIX B

GIS Model for Archeological Site Prediction and Survey Planning at EVER

GIS Model
for Archeological Site Prediction
and Survey Planning
at EVER

Prepared by Guy Prentice and Jill Halchin
Southeast Archeological Center
April 2014

Introduction

Everglades National Park (EVER) requested that staff members of the Regionwide Archeological Survey Program (RASP) at the Southeast Archeological Center (SEAC), in Tallahassee, Florida prepare a site prediction model to aid the park in assessing the potential for unidentified archeological sites within various park ecosystems and landforms, and to suggest archeological survey strategies to evaluate and refine the model over time. Existing site information recorded in SEAC's archeological site Geographic Information System (GIS) and the NPS's Archeological Site Management Information System (ASMIS) database were used in combination with the most current existing GIS vegetation and elevation data provided by Everglades National Park to characterize various portions of the park as high, medium, low, and very low site probability areas based on the statistical correlation of known sites with specific vegetation types and, to a lesser extent, topographic features. Unfortunately, there are several factors that limit the usefulness of the available GIS data, but, despite the shortcomings, a number of predictive correlations are evident, and they can guide the planning for future survey efforts. The results of that survey effort can then be used to improve and refine the predictive model, which can in turn be used for both general cultural resource management purposes and prioritizing the inventory of all significant archeological sites in the park as required by law.

Prior EVER Archeological Survey

Normally, in the process of developing predictive models for archeological site distributions, one reviews the results of past archeological research and assesses the potential effects or biases that prior archeological surveys may have had on identifying where currently known sites are located. Fortunately, this has essentially been done previously by John W. Griffin (1988) in his synthesis of the archeology of Everglades National Park and augmented by subsequent survey conducted in 2004 by SEAC Archeologist Margo Schwadron (2009). Rather than recount here what Griffin has already thoroughly presented in his overview and assessment of the archeological resources contained within the park, the current document will simply summarize some of the primary highlights abstracted from his synthesis that are most pertinent to the topic at hand, which are the history of prior survey and patterns that have been previously identified concerning the distribution of sites within the park.

Prior to the survey work that was conducted by SEAC archeologists in the early 1980s, the vast majority of sites within Everglades National Park were recorded during archeological investigations for which we have no information regarding where surveys were conducted except in those instances where site locations were recorded. This includes the 50 sites identified during Goggin's survey of the Everglades in the 1950s (Griffin 1988:167), the incidental recording of sites by EVER park staff in the mid-1950s to mid-1960s (Griffin 1988:168), and Griffin's own abbreviated survey involving the visitation of 21 sites in 1964 (Griffin 1988:168).

In 1965, the NPS contracted with Florida Atlantic University (FAU) for the preparation of an archeological base map, which was directed by William H. Sears and was to include aerial photomosaics showing all known site locations within the park, of which there were 74 at the time of the project (Griffin 1988:168). Although the identification of archeological sites on the basis of vegetation patterns was pioneered during this study, the bulk of the project consisted chiefly of compiling the results of previous work with little in the way of site visitation (Griffin 1988:169).

Except for a few serendipitous discoveries by park staff that increased the park's overall site count slightly, the site information that had been compiled by Sears and his FAU colleagues for EVER in 1965 essentially represented the full inventory of known sites in the park until a three-year survey of EVER was conducted from 1982 to 1984, led by a team of SEAC archeologists who had just completed a five year inventory project of sites in Big Cypress National Preserve (BICY). The first phase of the 1982-1984 SEAC survey project involved reconciliation of all the EVER site information previously compiled by the State of Florida's Master Site File (FMSF) staff. Of the 168 sites considered candidates for inclusion in the EVER site inventory, 87 were confirmed to exist within the park, 37 were found to be outside park lands, and 35 were listed as having unknown locations as a result of insufficient data in the FMSF (Taylor 1985:22-23). Nine sites were deemed to be duplicates. Subsequently, over the course of their three-year survey, the SEAC archeological team added an additional 104 sites to the park's inventory, bringing the total site count to 191 (Griffin 1988:169).

Guided by the results from their earlier five-year survey at BICY, the 1982-1984 archeological inventory efforts brought to bear at EVER by the SEAC archeologists were largely guided by the visual examination of false color infra-red aerial photographs (Mark Hurd 1:80,000) that had been obtained for the entire park and the targeting of areas that appeared as magenta colored patches on the aerial photos, which experience at BICY had shown was a reliable signature (Ehrenhard et al. 1982:25) for hardwood hammocks and the most likely places for finding prehistoric and/or Seminole occupations. Their predictive model was based on the premise that these aboriginal sites would be primarily located on higher drier hammock ground, and secondly would be nearest the deepest adjacent water course or slough (Griffin 1988:176). In other words, using the color signatures visually observable on the false color imagery, which typically correlated with hardwood hammocks, the SEAC archeologists focused mainly on identifying and visiting the targeted hardwood hammocks to seek out sites, with the logical result that most of the sites discovered during the three-year survey corresponded with this forest vegetation type. To avoid claims of sample bias in their survey methods, however, the project supervisors expanded their sampling strategy during the first year of the survey to include spot ground checks at 35 loci situated in various other environmental settings, including sawgrass, salt marsh, pinelands, salt prairie, and bay head, all with negative results (Ehrenhard et al 1982: 26; Griffin 1988:175). The project authors assert that their "numerous probes" in most of these environments showed them to be too low and wet to be suitable for habitation, but conceded that excavations had not been undertaken to rule out the possibility of deeply buried cultural remains (Ehrenhard et al 1982: 26). Although there does not appear to have been a deliberate effort to sample more of the low probability environments following this initial year of field investigation, the SEAC archeologists continued to document those locations where their site visits failed to turn up evidence of human occupation. In the final report prepared after the three-year project was completed, Taylor (1985:12) reported that

> **All ground truthed points and selected helicopter overflights were plotted on the survey's quadrangles. A total of 408 ground truths were conducted during the three field seasons from 1982 to 1984.**

Until very recently, the location of the EVER survey quadrangle maps employed during the 1982-1983 SEAC survey to record site visits had gone missing from the accessioned materials (SEAC Acc. 590) curated with the documentation associated with this three-year project, but as a consequence of undertaking the present study the survey's quadrangle maps have been relocated and the information contained within them added to the Center's GIS data so that it can be used for further analysis and model testing. And while we are still in the process of determining which of the visited sites recorded on the survey's quadrangle maps involved on the ground inspections with subsurface testing and which consisted of less intensive survey methods, among the 433 site locations and site visits that are documented on the quad maps, 123 (28.4 percent) fall within what are currently classified as high probability areas, 36 (8.3 percent) fall within medium probability areas, 124 (28.6 percent) fall within low probability zones, and 150 (34.6 percent) fall within very low probability zones. Also filed among the papers curated with this project is a hand written compilation of negative site visits with each entry on the list generally consisting merely of a UTM grid coordinate, an indication of the kind of visit (ground truth, ride-by, or aerial fly-by), a page number in a field note book, and the date on which the visit occurred. The information contained on this list was also entered into the Center's GIS, resulting in 237 records distributed among the four probability areas as follows: 115 high (48.5 percent), 13 medium (5.5 percent), 79 low (33.3 percent), and 30 very low (12.7 percent), although again we are still in the process of refining the level of investigation conducted in each case.

To summarize, during the 1982-1984 SEAC EVER survey, over 400 areas located in a variety of environmental settings were examined at different levels of intensity, of which 191 proved to be archeological sites. The majority (125 of 191 or 82.2 percent) of these were prehistoric earth middens located within the interior portions of the park where they were generally situated on hardwood hammocks. In terms of acreage, however, these relatively small earth midden sites constituted a small proportion of total site area (Table 1), with shell works and shell middens located in the Ten Thousand Island area comprising nearly 87 percent of the combined total area for all known prehistoric sites, when a few miscellaneous site types such as eroded beaches, relic shell ridges, and the like are excluded.

Following completion of SEAC's EVER survey in the 1980s, it was Griffin's opinion that "Certainly most of the major sites, meaning the larger and more conspicuous ones, are known, but some smaller middens have probably escaped detection" (Griffin 1988:179). He then pointed out the area near the mouth of the Shark River as one that has probably eluded complete inventory due to logistic problems and its "inundated labyrinthic character" as well as several sites reported by Small, Hrdlicka, and Goggin that have not been relocated and subsequently dropped from the official site inventory for the park (Griffin

Table 1. Total Areas for the major site type Groupings Identified during the 1982-1983 SEAC EVER Survey (from Taylor 1985:39).

Location	Site Type	Acres	Percent	No.	Percent
10,000 Islands	Shell Works	231.2	75.5%	12	7.6%
10,000 Islands	Shell Middens	34.94	11.4%	20	12.7%
	Subtotal	266.14	86.9%	32	20.4%
Mangrove	Earth Middens	17.29	5.6%	26	16.6%
Shark Slough	Earth Middens	17.67	5.8%	62	39.5%
West Everglades	Earth Middens	2.15	0.7%	34	21.7%
Taylor Slough	Earth Middens	3.06	1.0%	3	1.9%
	Subtotal	40.17	13.1%	125	79.6%
	Total	306.31	100.0%	157	100.0%

1988:179-180). Admitting that the inventory of archeological sites at EVER "cannot be regarded as absolutely final," and that the rock ridge area in the eastern part of the park deserved additional attention in light of the late Paleoindian and Early Archaic projectile points that had recently been discovered with human remains and extinct megafauna by Carr (1986) at the dry sinkhole known as the Cutler Fossil Pit (8Da2001), Griffin also pointed out the possibility of the existence of inundated sites in the park interior as suggested by the finds dredged up at the Anhinga Trail site in 1968 (Griffin 1988:180).

In the 25 years that have passed since Griffin prepared his synthesis of the archeological research that had been conducted at EVER up to that point, there has been little substantive revision to his general characterization of the distribution of site types located in the park. To be sure, there has been additional survey and an increase in the park's archeological site count, particularly as a result of the inventory of sites in the Eastern Everglades Expansion Area (EEEA) that was conducted in 2004 by SEAC (Schwadon 2009), with this work largely reaffirming the high correlation of hardwood hammocks on tree islands as likely prehistoric and Seminole occupations (Schwadron 2009:1). The 2004 fieldwork also demonstrated the efficacy of using the University of Georgia (UGA) Vegetation Classification System for South Florida National Parks GIS coverage to computerize the identification of hardwood hammocks so they can be targeted for archeological survey.

In addition to reaffirming the high degree of correspondence between hardwood hammocks and prehistoric occupations, the 2004 SEAC survey also demonstrated that like the tree islands supporting hardwood hammocks, the slightly elevated areas characterized as bay heads and willow tree islands were also likely to have sites as well. The question over whether concentrating exclusively on these few vegetation types for prioritizing site surveys was potentially underrepresenting the potential for sites in other vegetation zones was also moderately addressed when Schwadron expanded her survey sample to include pineland, shrub lands, and marsh areas (Schwadron 2006, 2009:91). This was accomplished by examining six locations within a 1054-acre tract of land located along the periphery of the EEEA that was slated for a proposed land exchange with the South Florida Water Management District. The six targeted areas in the proposed land exchange were classified in the UGA vegetation coverage as hardwood scrub lands, exotics (Brazilian pepper), and marsh/willow islands. Pedestrian walkovers and excavation of a single shovel test at four of the six sampled areas failed to turn up any evidence of past occupation. Access to the other two targeted areas was blocked by canals; however visual inspection of the two areas determined that they were clusters of Brazilian pepper, had no high ground and, therefore, no potential for being site locations (Schwadron 2006:15).

After completion of the EEEA survey, Schwadron (2009:306-307) concluded

> **High potential archeological site areas include classic hardwood tree islands, willow tree islands in Shark River Slough, and a linear cluster of tropical hammocks along Grossman's Ridge. Low potential areas include low inundated areas, such as sawgrass prairie and marshes, as well as scrubland, willow islands and exotics located within the dry, low rocky glades.**

Schwadron's research did more than simply reaffirm the site prediction model that had been tested during the 1982-1984 SEAC EVER survey. Coupled with similar recent findings that were being reported somewhat simultaneously elsewhere (e.g., Carr 2002), Schwadron's research in the EEEA substantially altered archeologists' perceptions of when prehistoric settlement of the interior Everglades occurred. Prior to undertaking the EEEA project, most archeologists, following the arguments presented by Widmer (1988) had concluded that prehistoric occupation of the Everglades had not occurred until approximately 700 B.C. as a consequence of sea level fluctuations. Prior to the stabilization of sea levels at near modern levels approximately 2700 years ago, Widmer had viewed the interior of the Everglades as largely a desert, incapable of supporting anything other than small groups of wandering hunter-gatherers. But, as a result of Schwadron's documentation of Middle to Late Archaic period occupations at four sites—Sour Orange Hammock (EVER-203, 8Da2181), Poinciana Hammock (EVER-206, 8Da71), Irongrape Hammock (EVER-208, 8Da72), Heartleaf Hammock (EVER-221, 8Da2192), and Grossmans Hammock Complex (EVER-229, 8Da28)—within the EEEA that dated as much as 3000 B.C., our ideas of when the Everglades were inhabited now need to be adjusted.

Recognition of these much older occupations was accomplished in part by penetrating a buried mineralized carbonate layer present on nearly all of the tested tree islands, and is currently interpreted as a calcrete layer that appears to mark a hiatus in human occupation of the interior Everglades from circa 1800-700 B.C. (Schwadron 2009:107), perhaps as a result of an extended period of higher water levels during this time period or alternatively as a result of human efforts at land modification (or both). The recognition of the existence of these Archaic period sites within the park has also prompted Schwadron (2009:43) to propose that other types of Archaic period sites, such as cypress pond mortuary sites similar to the Bay West site located on the western fringe of Big Cypress Swamp, may potentially be present within the EVER region, as well.

Other South Florida Site Prediction Models

The site distribution patterns that have been previously identified for EVER have also been observed in areas located outside the park boundaries. A study recently prepared by New South Associates (Smith 2008) for the Comprehensive Everglades Restoration Plan (CERP), has identified similar environmental associations with the distribution of known archeological sites within a project area spanning portions of 13 counties in south Florida. In the site distribution analysis offered by the CERP study, the more elevated areas within otherwise wet environments that can be characterized as supporting hardwood hammocks, bay heads, willow heads, and cypress heads, were again identified as containing the majority of post-Archaic period occupations (Smith 2008:35). The CERP archeological study also recognized the correlation between Paleoindian and Early Archaic occupations with former springs or sinkholes now inundated or covered by boggy peats (Smith 2008:33) as well as the presence of Middle and Late Archaic occupations beneath calcrete layers on tree islands.

Based on these observations, New South archeologists recommended that "pond margins, tree islands, hammocks, ridges, sinkholes, and slough margins should be considered to have Medium to High site probability until investigated through intensive subsurface testing" (Smith 2008:35). Conversely, pine flatwoods and low wet areas such as sawgrass prairies were considered to constitute generally low probability areas except potentially in those situations where they constituted a "contrasting biome" by virtue of their having localized higher relative elevation and better drainage compared to an adjacent, distinctly different environmental zone, in which case sites can also sometimes occur (Smith 2008:47).

Modeling EVER Site Distributions

It should be evident at this point that among the predictive models that have been previously developed for EVER and south Florida, the emphasis has been on identifying vegetation, elevation, hydrology, geology, and other environmental or geographical conditions that can be shown to have measurable correlations with the frequency of site occurrence. To a certain extent these approaches imply that past human behavior as reflected in these site distribution patterns are linked to past or present environmental variables that influenced settlement decisions, but precisely what those determinant variables were, whether it was the availability of dry land, botanical resources, terrestrial or aquatic fauna, ease of access, distance from the Gulf coast, or some socio-economic factor is a matter that can be addressed at another time (as per Russo and Anderson 2009). Rather than attempt to explain the reasons why sites occur where they do, for optimizing future site discovery as per Section 110 and for meeting Section 106 compliance requirements, the goal here is simply to determine the likelihood that unidentified sites exist in what are currently believed to be moderate to very low probability areas.

GIS Model Development

Building on the results of the previous studies summarized above, planning for model development for EVER began with examination of the available environmental GIS data sets—elevation, water, vegetation, soils, etc.—with respect to their likely potential for predicting sites. Factors evaluated included content, coverage, accuracy, coordinate system, datum, and format, all of which would affect the data's usefulness for the project and would identify the need for additional data processing to prepare GIS information for later steps in the analysis. As a result of the review, the only suitable data available are vegetation, elevation (from LiDAR), water, and to a minimal degree historical maps; however, issues were identified with each of these.

SEAC staff used ArcGIS 10.1 SP1 for the analysis, with the results stored in two geodatabases, one for the elevation-related analysis and the other for the sites, vegetation, and other data. Also included in the GIS analysis were historic maps that were georeferenced to indicate the approximate locations of potential EVER sites, such as Second Seminole War era camps and forts. The routes of historic roads, trails, and canals represented on a number of such maps were also digitized as a possible means of developing buffer zones around them where it is believed unrecorded historic sites are most likely to be found.

Elevation

This data does not cover the entire park, but its accuracy and resolution warranted further evaluation. The derived bare earth LiDAR data was used to reduce the effects of vegetative overgrowth in modeling the project area topography. Of the datasets provided by the park to SEAC, the highest resolution consists of 5-foot-cell rasters for all of the Collier County and most of the Monroe County portions of the park, and 10-foot cell data for the eastern and southern edges of Dade County. A large gap in the park's interior exists for the Shark River Slough, the prairies, the central pine and cypress zones, and Taylor Slough areas. The coordinate system for the elevation data is Florida State Plane East HARN 1983, with elevations expressed in feet. The horizontal accuracy of the source (LiDAR) data for Dade County was estimated as 3.8 ft at the 95 percent confidence level. The vertical accuracy varied, but was estimated to be, in general, 1.19 ft at the 95 percent confidence level. The Collier and Monroe data horizontal accuracy is described as 3.8-feet and the vertical was estimated at 0.6-foot for unobscured areas.

Water

Water-related data is available from several sources, although all are based largely on the National Hydrography Dataset. For purposes of this project, the simplified versions that were used as breaklines during LiDAR processing and data provided with the ArcGIS license from ESRI proved most useful. The breaklines were in Florida State Plane coordinates and the ESRI data were in degrees WGS1984. These datasets were merged to create a single GIS source for most of the streams and lakes and many of the ponds in the park. The data played a peripheral role in initial development of the prediction model, but may prove useful in refining the model.

Vegetation

The Vegetation Classification System for South Florida National Parks data set was originally created by the University of Georgia (UGA) in 1999. That portion pertaining to EVER was provided to SEAC by EVER GIS staff in UTM zone 17 NAD 1983 (original). During the examination of this data, it was discovered that the vegetation polygons did not align well with other data layers, such as the elevation and high resolution aerial imagery. Numerous measurements throughout the dataset showed that discrepancies ranged from less than 10 meters to more than 50 meters, with many areas in the 20-30-meter range. In general, discrepancies increased from northeast to southwest, but were inconsistent in both direction and distance. It was not a simple shift, scale, or rotation problem. Because many prehistoric sites are quite small, a prediction model with errors of this magnitude would be of very limited use. Examination of coordinate systems, datum points, and map transformations did not reveal any one of those alone to be the source of the problem.

Because the vegetation data that the park provided for this project had been merged into datasets coterminous with the fire management units, a copy of the data as created by UGA was also checked and found to have the same errors. UGA produced the data broken into areas that are more or less coterminous with USGS quadrangles. An internet search for more information located a journal article (Welch, Madden and Doren 1999), which described the steps undertaken to produce the vegetation data. They began with georeferencing satellite imagery for south Florida using 23 GPS positions for roads and bridges as registration points. The digitizing was based on color infrared imagery (CIR) that had been enlarged from 1:40,000 to 1:10,000 scale. The CIR images were georeferenced to the satellite images, providing an estimated accuracy of ±5 to ±9 meters, similar to that of 1:24,000 scale quads. While this procedure was adequate for its day, especially given the large area to be mapped, errors could have been introduced in any or all of the steps in the process.

Historic Maps

A concerted effort was made within the time allowed to locate historic maps that could identify the approximate locations of heretofore unidentified historic sites located in the park. The most obvious avenue to begin the search was for maps dating to the early nineteenth century showing sites related to the U.S. military's campaigns against the Seminole groups occupying the Everglades and Big Cypress Swamp. Among those most readily available were various versions of the "Military Map of the Peninsula of Florida" prepared by Joseph C. Ives in 1856, a portion of which is reproduced for the reader as Figure 2. The 1856 map was georectified in the Center's GIS based on the lines of latitude and longitude drawn on it, to produce Figure 3, which puts Fort Henry close to the eastern boundary of the park and also shows

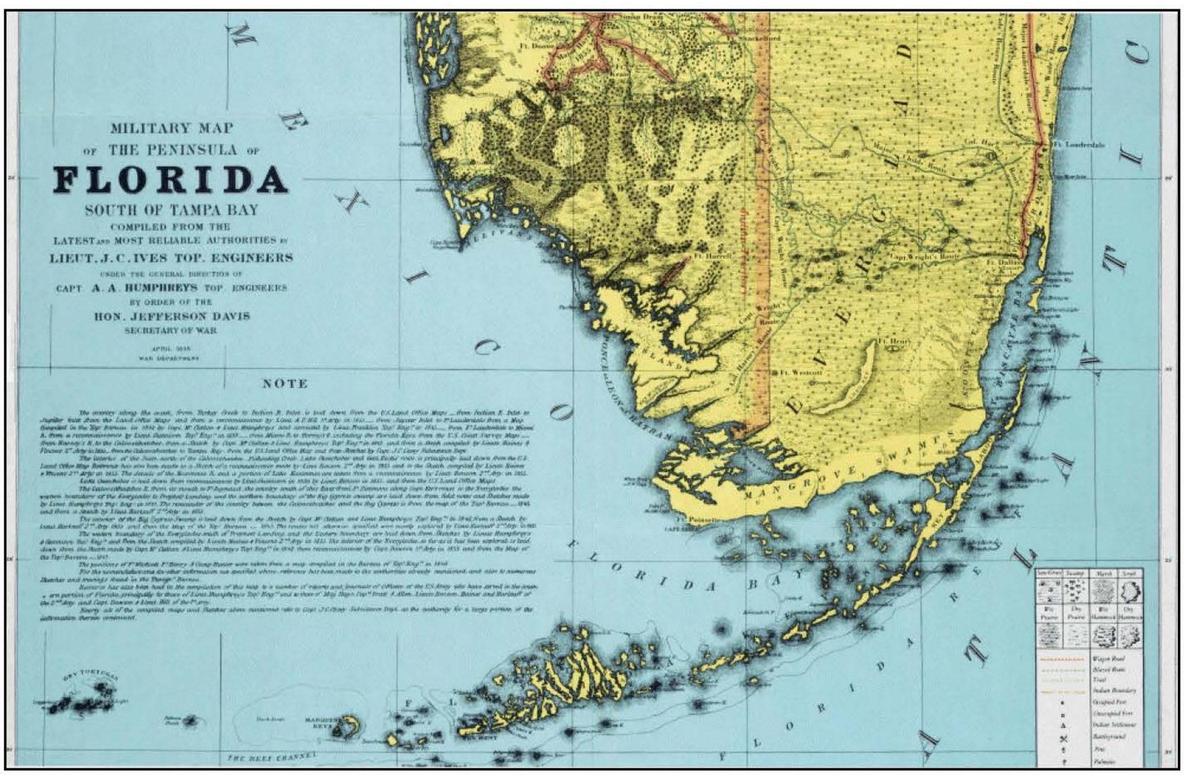


Figure 2. Select portion of the "Military Map of the Peninsula of Florida South of Tampa Bay" prepared by Lt. Joseph C. Ives in 1856.

two military posts—Camp Hunter and Fort Westcott (a.k.a. Ft. Wescott)—located west of what is called Long Key and within the Shark River Slough area of EVER. As Greg (2008:57) has previously noted, under this projection, the 1856 Ives map cannot be viewed as particularly reliable for pinpointing exactly where these sites were located, but it does appear to provide a reasonable approximation given the map's relatively good correspondence with Florida as a whole.

Fort Henry, Camp Hunter, and Fort Westcott are all shown on a map prepared ten years earlier by Joseph Goldsborough Bruff and engraved by D. McClelland entitled *The State of Florida Compiled in the Bureau of Topographical Engineers from the best authorities*. When scaled and georectified using the latitude and longitude indicated along the edges of the map and displayed against the EVER park boundary in a manner similar to that done for the 1856 Ives map in Figure 3, the result is the badly plotted map shown in Figure 4, where there is clearly an error in the assigning of latitude and longitude on the 1846 Bruff map.

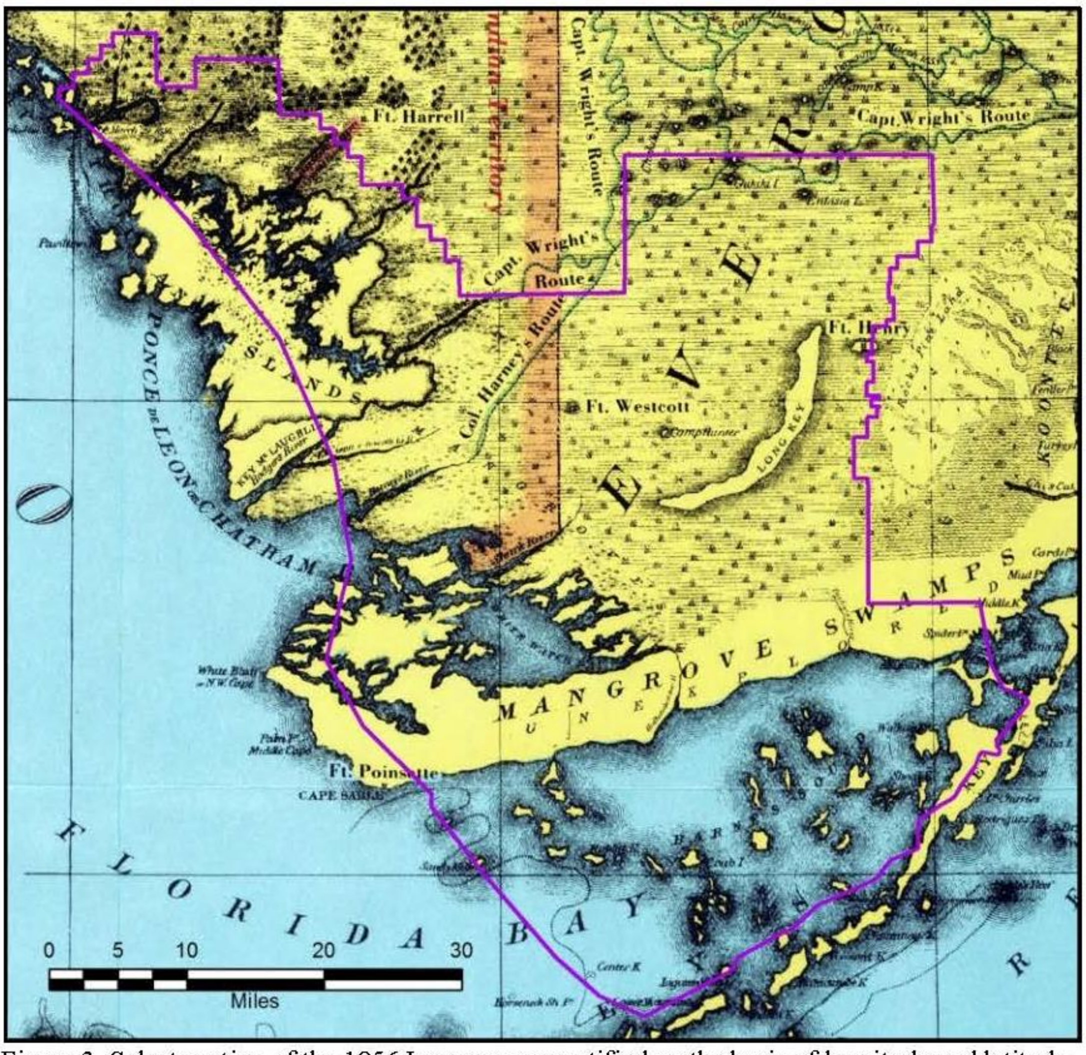


Figure 3. Select portion of the 1856 Ives map georectified on the basis of longitude and latitude and displayed with the EVER park boundary (magenta line).

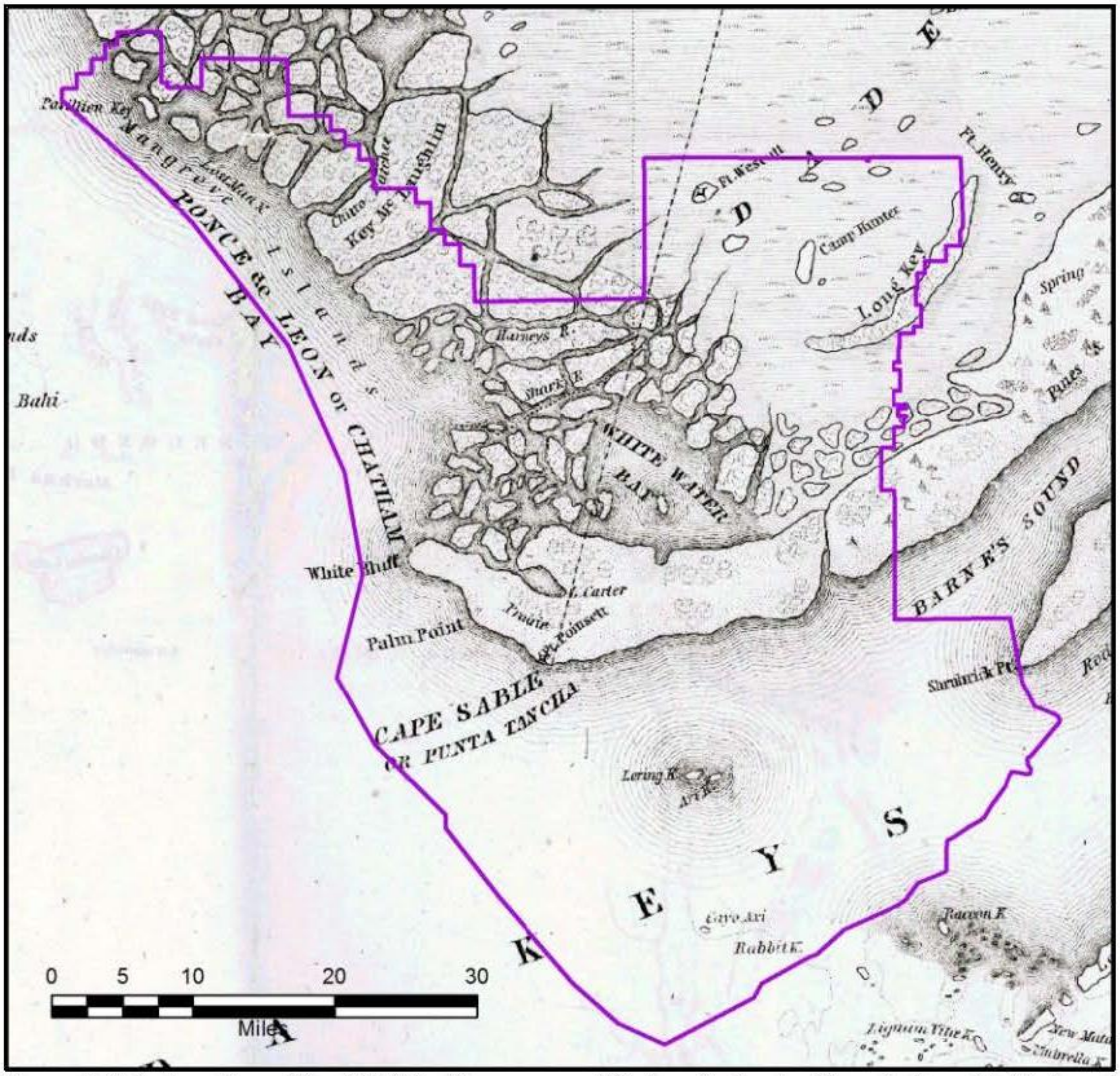


Figure 4. Select portion of the 1846 Bruff map georectified on the basis of longitude and latitude and displayed with the EVER park boundary (magenta line) (from http://lcweb2.loc.gov/gmd/gmd393/g3930/g3930/ct000140.jp2).

If, however, the same scale is retained and the map is simply shifted southwestward to align the southern end of Long Key with what today is the southwestern end of Long Pine Key (as shown in Figure 5), the result places Fort Westcott along the western edge of Shark River Slough toward the head of the Broad River, and Camp Hunter falls in the approximate location of Papaya Hammock and Pa-hay-okee Bayhead. With this projection, Camp Henry is plotted outside the eastern edge of the park boundary.

According to an article appearing on page 2-D in the Saturday, Dec. 10, 1983, issue of the *Sarasota Herald Tribune* (Figure 6), the location of Fort Henry was discovered in 1983 by Bill Steele after the star-shaped feature was pointed out to him on an aerial photograph by Florida archaeologist Robert Carr. Also, according to the 1983 article, the relocated fort was said to be found in the Everglades on a tree island among agricultural fields roughly 5 miles southeast of Chekika State Park where it "overlooked a crucial canoe waterway."

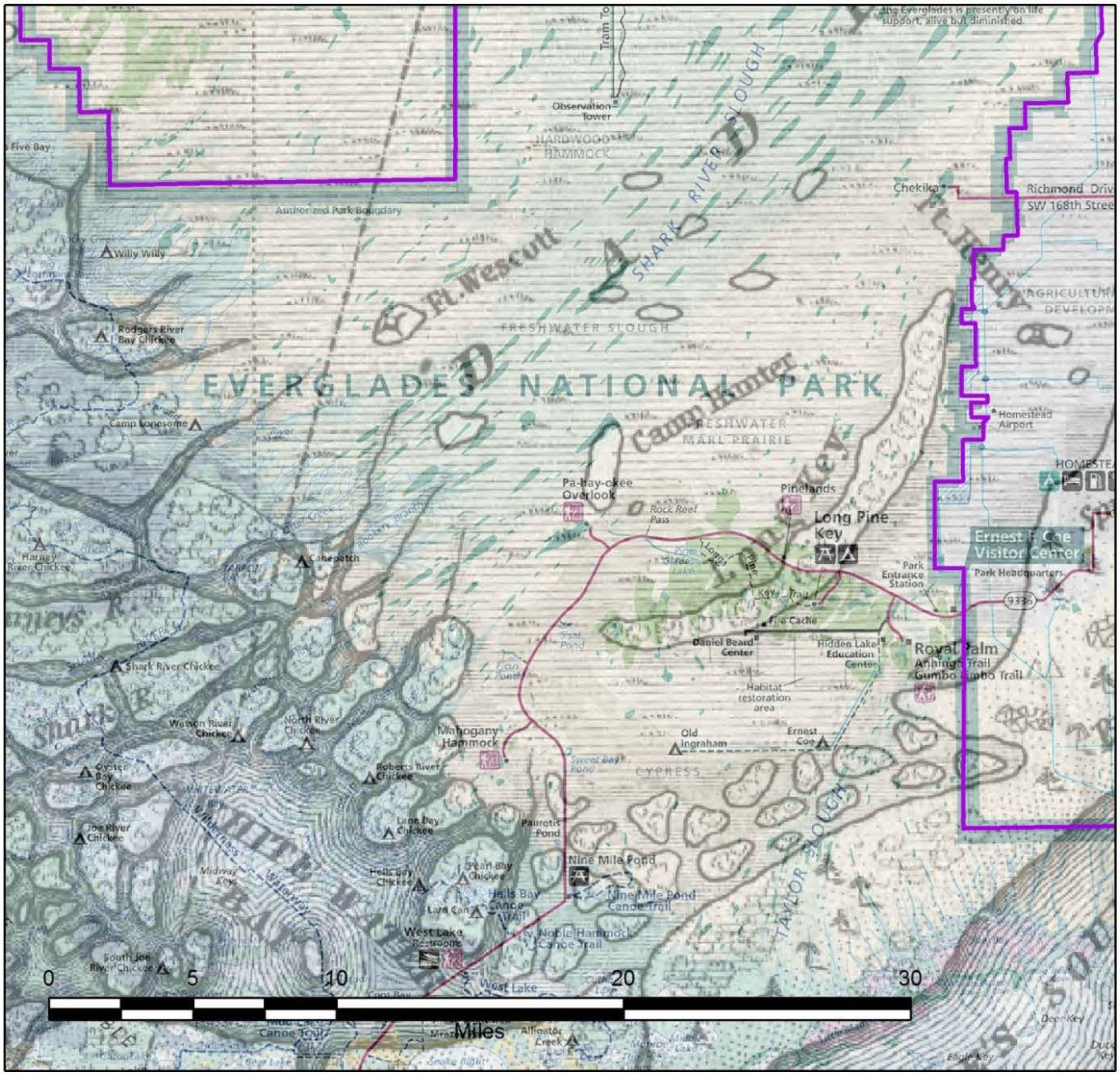


Figure 5. Repositioned semi-transparent copy of the 1846 Bruff map overlaid onto the EVER park brochure map.

Interestingly, prior to the initiation of this study in 2013, the FMSF had no record of the discovery of Fort Henry among the site files kept by the state. But, when contacted directly to provide more information on the fort's discovery, Carr provided both SEAC and the FMSF with newly prepared state site forms along with a map showing the location of Fort Henry (8DA3223) situated approximately 4.5 m southeast of the Chekika day use area (formerly Chekika State Park) and outside the park.

According to the hypothetical projection provided in Figure 5, the distance from the Chekika day use area to Fort Henry is around 6 miles and Fort Henry is likewise located outside the park. In the projection of the 1856 Ives map shown in Figure 3, the distance between Chekika day use area and Fort Henry is only 3.5 miles and Fort Henry falls along the park boundary, suggesting that the georeferencing of the 1846

Historic Fort In Everglades Finally Found

MIAMI (AP) - A local historian has discovered the site of a fort built in 1842 as a major naval base in the Everglades during the Second Seminole War, ending what experts call a century-old mystery.

Bill Steele recently pinpointed Fort Henry, southwest of Miami, on a small island in the Everglades after months of detective work that included digging for information in the National Archives in Washington.

The fort, named for Lt. John C. Henry, commander of the USS Wave, which operated off the South Florida coast during the Seminole Wars, was part of a chain of military depots crisscrossing the peninsula. It has since been destroyed by crop plowing.

Over the years, archeologists looked for Fort Henry, but made little progress because military maps incorrectly showed the base near Long Key, a major tree island in the Glades west of Homestead, said Dade County Archeologist Robert Carr.

Steele remained absorbed in the mystery.

"I was looking at the 1856 Ives military map of Florida and saw that Fort Henry was close to Miami," he said. "I wanted to see it."

The hunt led Steele through letters and reports of military men who had served at Fort Henry. He said their discriptions of the area differed greatly from the concept of mapmakers and even more from what is there today.

Steele said he found a set of Navy map coordinates that put Fort Henry in an area of agricultural fields about five miles southeast of Chekika State Park.

"A friend of mine and I went out there with a metal detector. We gave it a kind of thorough going over. But we didn't find anything," he said.

Then Steele showed his evidence to Carr, who obtained six aerial photos by the U.S. Geological Survey.

"There was nothing there but this little island about a hundred yards from where we had been looking," Steele said. "But then Carr pointed to the star-shaped area on the island and we realized it was the site of the fort."

Steele said an outline of the fort's walls could be spotted in the aerial photo.

The tiny fort had overlooked a crucial canoe waterway through the sawgrass used by the Seminoles to travel between their Everglades camps north of Miami and the Shark River in the heart of the Everglades.

Figure 6. Portion of page 2-D of the Saturday, Dec. 10, 1983, issue of the *Sarasota Herald Tribune* (from Google News Archives http://news.google.com/newspapers?nid=1755&dat=19831210&id=hPQcAAAAIBAJ&sjid=yWgEAAAAIBAJ&pg=2799,9902333).

Bruff map as shown in Figure 5 may be closer to reality than the projection of the 1856 Ives map as shown in Figure 3.

Although not illustrated here, another attempt to georeference the 1856 Ives map was made by matching Fort Henry and Cape Sable's Fort Poinsette on the 1856 Ives map, respectively, with the locations of 8DA3223 and Cape Sable in the SEAC GIS. In this case the plotting of Chekika Island on the Ives map fell 1.7 miles (2800 m) west of the true location of Chekika Island. This projection also placed Camp Hunter within 1 mile (1700 m) of Papaya Hammock and Fort Wescott within 0.5 mile (650 m) of Mosquito Island where EVER-66 is reported to exhibit " a prolific scatter of historic debris" (Taylor 1985:348).

In addition to the military maps associated with the U.S. campaigns carried out against the Seminoles during the Second (1835-1842) and Third Seminole (1855-1858) Wars, a number of other maps of a historical nature were found that showed the location of Fort Henry southwest of Chekika instead of southeast as previously shown on the 1846 Bruff and 1856 Ives maps. These include a map of Florida included in the 1875 publication of *Gray's Atlas* (Figure 7) and a map published in 1888 entitled *A New Sectional Map of Florida* (Figure 8).

The 1875 *Gray's Atlas* map is also different from the Seminole War era maps previously illustrated in that it shows Fort Henry located northwest of Long Key's northern tip rather than northeast. It also shows the fort slightly south of the east-west oriented line separating Township 55S from 56S, but has erred in numbering the townships such that what is numbered Township 55 on the map is actually Township 56, 54 is actually 55, etc. Except for its error in numbering the townships, the placement of Fort Henry on the *Gray's Atlas* map is not unlike that shown on the 1888 sectional map in terms of its placement relative to the township lines, but the 1888 map also includes a place labeled "Morau" that falls within the boundaries of EVER. A search of the internet for the term Morau failed to turn up anything related to the history of the Everglades.

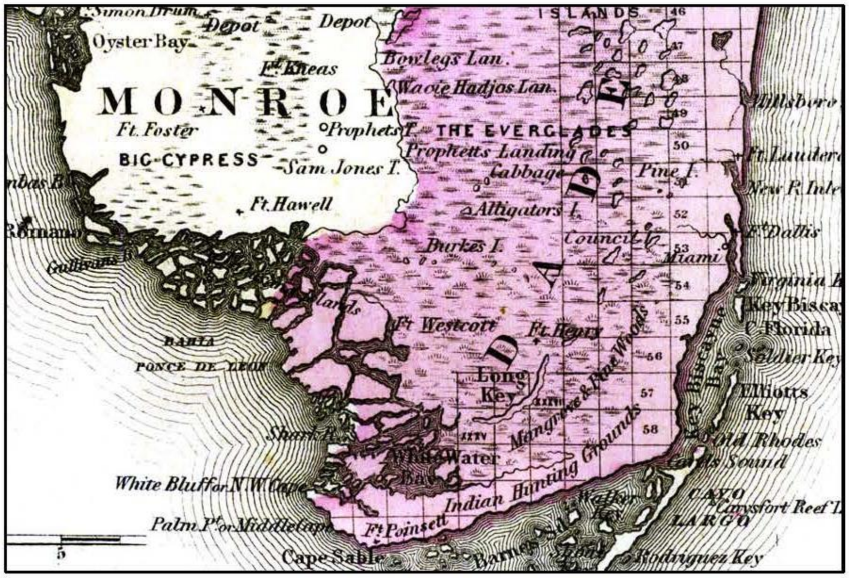


Figure 7. Select portion of map of Florida included in *Gray's Atlas* (O. W. Gray and Sons, Philadelphia, 1875; from http://fcit.usf.edu/ florida/maps/pages/4200/f4215/f4215.htm).

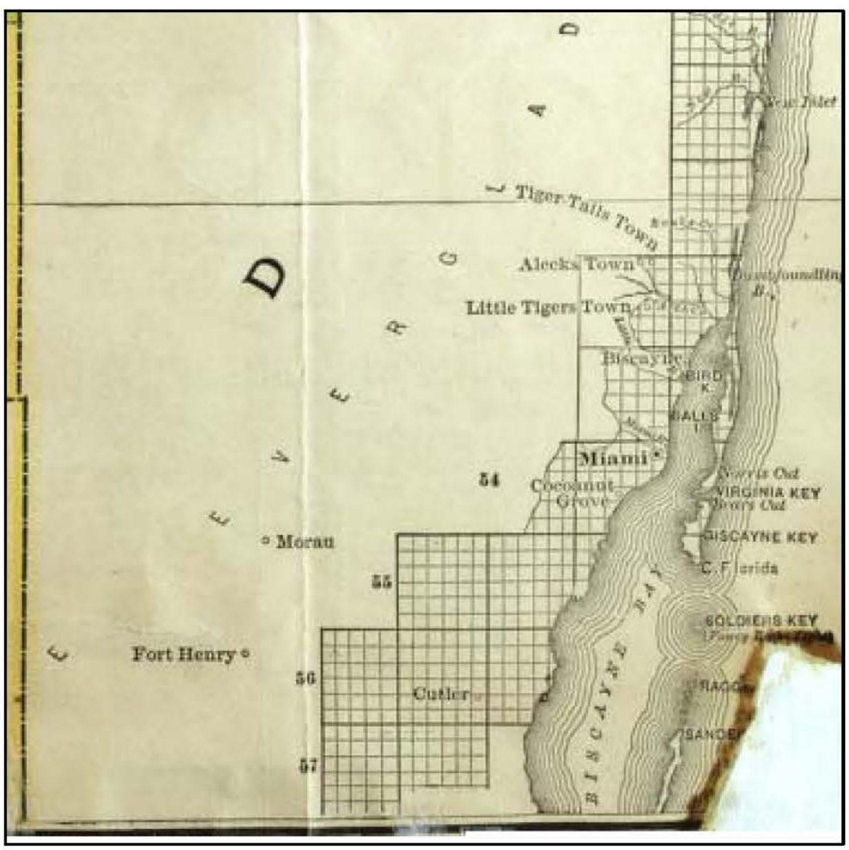


Figure 8. Select portion of *A New Sectional Map of Florida* published in 1888 by Matthews-Northrup Company, Buffalo (from http://fcit.usf.edu/ florida/maps/pages/9700/f9758/f9758.htm).

A map drafted by William J. Krome while surveying a potential railroad route from Miami to Cape Sable for Flagler's Florida East Coast Railway Company in 1903 (Figure 9) is potentially useful in that it shows an early twentieth century perspective of what constituted Long Key, or Long Pine Key, as it has since become known. It also shows the approximate routes that had been taken through the Everglades by earlier Everglades explorers such as Lt. Hugh Willoughby in 1897.

Unfortunately the 1903 Krome map fails to provide much information regarding the historic cultural landscape, although it does show the locations of Krome's base camps, which he established at various points along the route of the planned rail line. These may have some archeological potential.

The route for the railroad from Miami to Cape Sable that had been proposed on the basis of Krome's 1903 survey was never built, but it would not be too many years before plans for connecting Miami to Cape Sable by road and canal would come to pass. A digital copy of a map entitled *Special Road and Bridge District No. 1* was found that shows the Old Ingraham Highway extending from Royal Palm State Park to the community of Flamingo (Figure 10), but once again the digital image was of very poor quality making other features on the map open to question. The map appears to show a second road paralleling the Homestead Canal along its easterly route from Lake Ingraham near Cape Sable until it intersected with Old Ingraham Road approximately 1.5 miles east of Bear Lake, but it could be the route way shown to Cape Sable was simply the Homestead Canal itself. According to Paige (1986:147), however, "construction of the Homestead Canal" was "along the Ingraham Highway" and that "the Cape Sable Road" to Royal Palm State Park was constructed to coincide with the dedication ceremonies held for the newly established park in 1916 (1986:181), which suggests that a roadway of sorts was created atop the berm paralleling the canal.

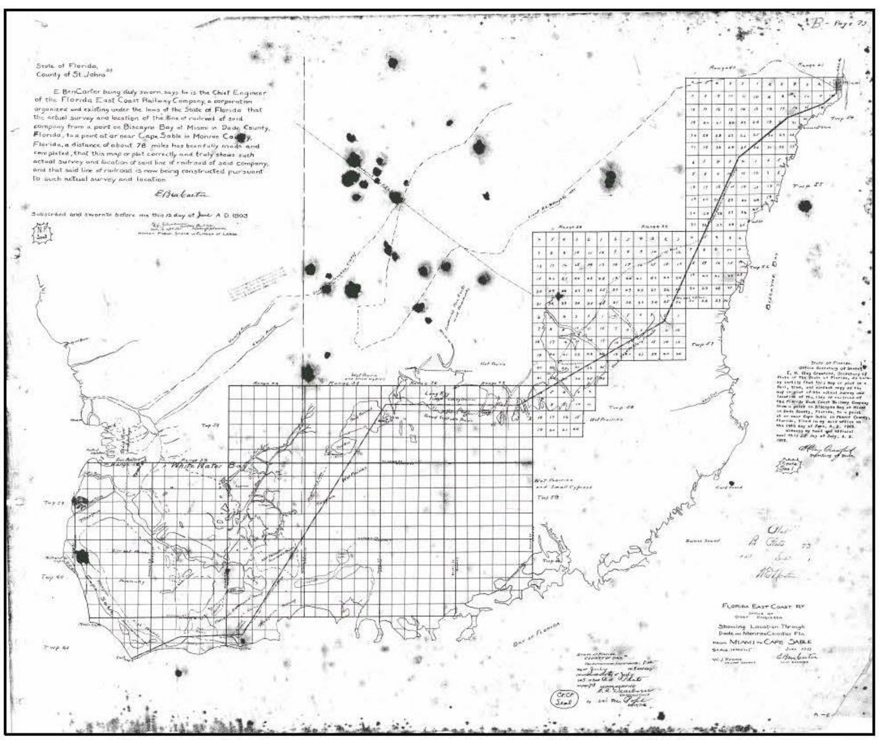


Figure 9. Krome's 1903 survey map (courtesy of Jerry Wilkinson).

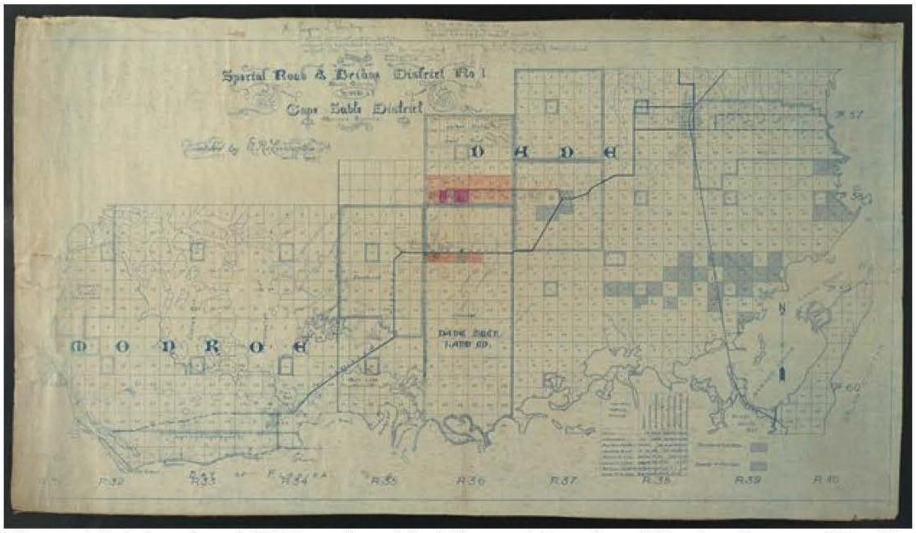


Figure 10. Map dated 1920 and entitled *Special Road and Bridge District No. 1*"
(from http://purl.fcla.edu/fcla/dl/RTAM00990001.jpg).

The last map to be introduced here is a map included in Nash's (1931) S*urvey of the Seminole Indians of Florida*. Drafted in 1930, the Nash map (Figure 11) shows the Willie Jim camp (numbered "1" in blue) located near the northern margin of Long Pine Key in the vicinity of Pine Glades Lake, although the lake did not exist in 1930. What did exist, and perhaps explains the presence of the Willie Jim camp in this approximate location, is the eastern end of Rock Reef Pass, which is a natural elevated ridge that extends from the margin of Long Pine Key towards the hardwood hammock/bayhead island where Pa-hay-okee Lookout Tower now stands. From here it is only a short distance northwest to Shark River Slough.

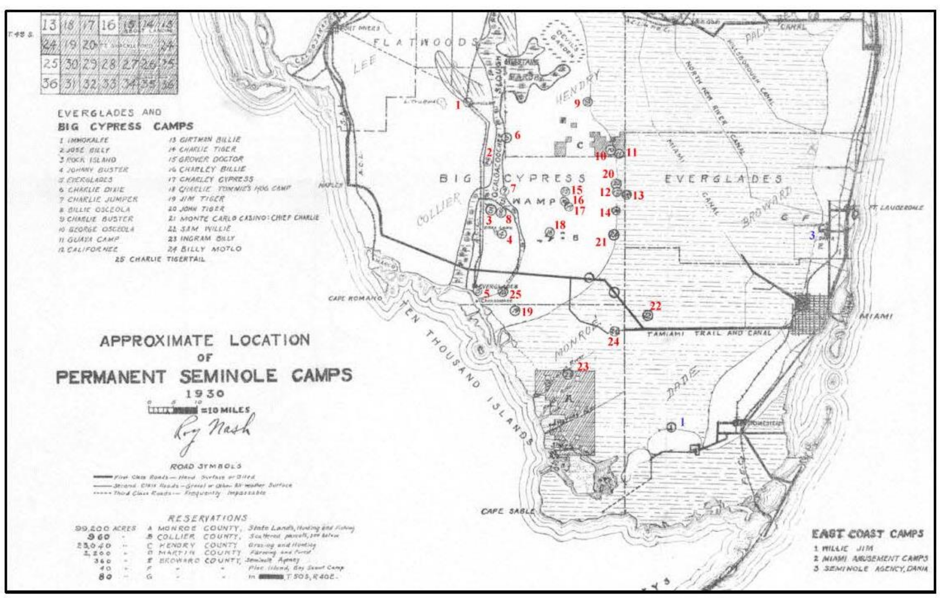


Figure 11. Portion of 1930 Nash map with colored numbers added to aid legibility.
Big Cypress Camps are labeled in red while East Coast Camps are labeled in blue.

Historic Survey Plats
A search of the early survey plats posted at the Florida Land Boundary Information System (LABINS) web site (http://data.labins.org/2003/SurveyData/LandRecords/GLO/index.cfm) based on township and range values coinciding with areas of the park identified 45 historic plats available for download. Of all the plats downloaded, six showed possible features or anomalies which bore further investigation. After comparing those six plats with their associated U.S.G.S. quadrangle maps it was found that all of the "anomalies" were non-cultural and provided no additional potential archeological information. The downloaded digitized plats were retained, however, for the historic vegetation information they contain.

1940s Imagery
These files were obtained through download from the South Florida Information Access (SOFIA) website http://sofia.usgs.gov/exchange/aerial-photos/index.html. They had been georeferenced. The photographs are dark and, compared to modern imagery, low resolution. Nevertheless, apparent buildings are occasionally discernible and well-travelled roads readily identifiable, so the files were examined for evidence of changes that would indicate the presence of such human activity. Other than changes along the Tamiami Trail, only a handful of possible historic structure locations were observed in the general area of what is now the Hidden Lake Education Center. This was also an area where a number of dirt roads were visible on the 1940 aerial photos, roads that are currently followed in some sections by fire roads that crisscross the same area today. These have been digitized along with the routes of Old Ingraham Road and Old Tamiami Trail Road, which were added to the historic road geodatabase by comparing the 1920 road map provided previously as Figure 10, the georeferenced 1940s aerial photos, and modern aerial imagery.

Modern Imagery
During the course of working on the various GIS layers, a number of features that appear to be cultural in origin were noted in the imagery and in the elevation data. The features appear to be canals in the 10,000 Islands and Cape Sable area. Some are likely related to early twentieth century farming and plantations, but some may be prehistoric. None of them have been added to the ASMIS database.

Data Preparation

Vegetation
Because prior archeological surveys in the park have shown a high correlation between human occupation and certain vegetation types, several attempts were made to improve the alignment of the vegetation data with the elevation data and thereby assure greater reliability for analysis.

Spatial Adjustment tools (included with ArcMap) were used to place adjustment links evenly over the entire park. The first adjustment used more than 50 links, and each of the two subsequent rounds employed about half the number of links in the preceding proceeding round. Random checks of the final results showed alignment with recent imagery and the elevation data was within 10 meters in most areas, and not more than 15 meters anywhere. A fourth attempt with the Spatial Adjustment tools, adding another 100+ points, actually began to degrade alignment in some areas, while providing only minimal improvements near the links.

The vegetation data was originally created by UGA in shapefiles that were intended to match the USGS quadrangles, so the possibility that the quads were misaligned was examined. First, the corners of one of the quad-sized vegetation datasets was aligned to a georeferenced quad obtained from USGS's website. This resulted in a misalignment of the digitized UGA vegetation and the vegetation depicted on the quad by over 50 meters in some areas. As a further test, Spatial Adjustment tools were used to align the vegetation polygon data to the quad using vegetation features that were visible in both. While this improved the data near the corners, other portions were misaligned.

Topology editing was attempted, although not expected to be especially productive. These tools are used to shift borders shared by adjacent polygons. The results of this brief test, including overlapping polygons and jagged lines, were unusable.

The final attempt to improve on the first series of Spatial Adjustment steps employed the Limited Spatial Adjustment Area option. Adjustments were performed on the UGA vegetation data within arbitrary 1500x1500-meter grid units. The grid approach kept the modifications to a scale suitable for smaller areas of misalignment while leaving areas that were better aligned untouched. This approach also provided the basis for estimating the time it would take to make the same adjustments over the full extent of the data. The outcome was very limited improvements over the first series of spatial adjustments and an estimate that it would take a couple of months or more to complete the Limited Spatial Adjustment Area process for the entire park.

Given the scope of the problem and pending deadlines, it was decided that the results from the first adjustments would be used for analysis.

Elevation

Topography and the availability of higher drier ground to provide habitable land is often an important variable for predicting archeological sites, and in the Everglades that means elevational differences of as little as 2-3 feet can be a significant factor. Consequently, the GIS analysis required a means of delineating areas that are discernibly higher than the surrounding terrain. GIS tools that were designed for modeling water flow are often used to generate models of higher ground. But in south Florida, the results, as might be expected, show that water flows everywhere and in all directions. Conversely, using absolute elevations across the entire park would not provide the appropriate data because there is an overall slope trending downward to the southwest from the Miami area. Another factor that exacerbates the problem is that the elevation data suffers from interference from the vegetation, despite the fact that the LiDAR data had been filtered to simulate bare earth. The original rasters and output from various geoprocessing tools all have a salt-and-pepper or stippled appearance due to the low relief and the fine-grained remnants of the trees.

To compensate for the overall slope in South Florida, in other words, to reveal relative elevation differences, a coarser (100-foot) version of the elevation data was subtracted from the higher resolution data. It was hoped that the resulting relative elevation data could then be used to delineate areas of higher ground compared to the local topography. The results were promising, but the areas of high ground were often very small and fragmented. To the human eye, with a brain processing the image, these areas are apparent, but the challenge was convincing the GIS software to recognize these areas on a computational basis.

Trials with several ArcGIS geoprocessing tools, such as reversing Sinks, Flow Accumulation, Slopes, and Focal Flow did not produce helpful results. However, examination of the output of the various trials revealed that areas of higher ground, which can be detected visually on hillshades, showed more variation in elevation, so a method for extracting those areas was developed.

The Focal Statistics tool was then used to generate a model of the elevation variability with the output expressed in terms of standard deviations. Due to the differences in the cell sizes used in the different original LiDAR datasets, the settings were slightly different. For the Dade County data, a search radius of 13 cells or about 130 ft was used. For Collier and Monroe counties, the radius was 25 cells or about 135 ft.

The output was then examined to ascertain the range of variability most common on known sites versus surrounding terrain. The next step would depend on the break point values chosen. A number of the site areas were checked on the Focal Statistics output, and the colors of the rasters were changed to test various break points, with different colors representing areas above and below the break. The goal was to choose break points that would show higher ground, but would not include too many small areas that are unlikely to be large enough for human occupation. The breaks also differed between datasets due to differences in overall variability. In the end, a standard deviation of 0.7 was chosen for Monroe County and 1.0 for Dade and Collier counties. Other break points can be tested in later revisions of this model, if deemed appropriate.

To produce the polygon data needed for later stages of analysis, the rasters obtained from the Focal Statistics tool were reclassified so that all cells were either above or below the break. The output was then converted to polygon data and combined to create a single dataset showing higher ground in the park.

Analysis

GIS was used to characterize the known sites in terms of vegetation and to examine how well the combination of vegetation and derived higher ground data actually correlate with or "predict" the occurrences of known sites. Because the majority of the sites classified as purely historic in ASMIS are large and often poorly defined, the statistical analysis considered only the sites that are listed as prehistoric, protohistoric or unknown (unknown typically means the site is American Indian, but the time period is uncertain). This restriction reduced the sample of sites used from 253 to 229.

Vegetation

As shown in Table 2 below, the park's 229 non-historic sites are found in only 21 of the 93 vegetation categories in the park. The vegetation categories containing the largest number of sites were Subtropical Hardwood Forest (80, or 34.93% of sites) and Bayhead (64, or 27.95%). These two groups, which account for 62.9% of all non-historic sites, can be considered the high probability vegetation zones. Far below the high probability group were Mixed Mangrove (20, or 8.73%) and Mud (19, or 8.30%). The vegetation zone called Mud mostly comprises beaches and shorelines of rivers and large ponds (but has also been applied to paved and unpaved roadways). The mud and mixed mangrove groups were considered to be medium probability zones. Each of the remaining 17 vegetation categories correlate with 3% or fewer of the sites, and these have been grouped together as constituting low probability zones. The remaining vegetation zones with no correlations with known sites have been classified as very low probability zones.

Elevation

The potential for elevation to predict sites was evaluated. Of the sample of 229 sites, 141 lack elevation data. Most of these 141 sites are located in the central part of the park, but a few are on small keys which were excluded from LiDAR processing. Of the 88 sites with elevation data, 56 (63.6 percent) were successfully predicted by the derived higher ground layer. Visual examination of the standard deviations for elevation variations and the hillshade showed that a few of the 32 sites that fell outside the higher ground polygons were in areas where the elevation variability was moderate, but still below the chosen break point. Others are poorly documented sites which may be mapped in the wrong locations, while some show no notable elevation characteristics at all. Different break points could be evaluated in the future, but given the current lack of data for the entire park, doing so was not considered to be vital at this point.

Table 2. Numbers of sites found in Everglades vegetation groups.

Vegetation Name	# Sites	% of Sites	Probability
Subtropical Hardwood Forest	80	34.9%	High
Bayhead Forest	64	27.9%	High
Mixed Mangrove Forest	20	8.7%	Medium
Mud	19	8.3%	Medium
Buttonwood Forest	7	3.1%	Low
Sawgrass	5	2.2%	Low
Bay-Hardwood Scrub	4	1.7%	Low
Black Mangrove Forest	4	1.7%	Low
Brazilian Pepper (Exotic)	4	1.7%	Low
Red Mangrove Forest	4	1.7%	Low
Cabbage Palm Forest	3	1.3%	Low
Cajeput (Exotic)	2	0.9%	Low
Halophytic Herbaceous Prairie	2	0.9%	Low
Hardwood Scrub	2	0.9%	Low
Succulent	2	0.9%	Low
Willow	2	0.9%	Low
Buttonwood Scrub	1	0.4%	Low
Mixed Scrub	1	0.4%	Low
Palm Savanna	1	0.4%	Low
Red Mangrove Scrub	1	0.4%	Low
Tall Sawgrass	1	0.4%	Low
Total	229	100.0%	

Multiple Factors

Considering the vegetation data alone, 46 (20 percent) of the 229 sites are not predicted by either high or medium probability vegetation types alone. So, would elevation data predict them? Of the 46, 12 lack elevation data, leaving only 34 sites to evaluate this question. Of these 34, 18 (53 percent) were classified as being on high ground, but 16 (47 percent) were not. However, visual examination of each of these 16 sites against the elevation data in hillshade mode reveals that a number of these sites are located on more elevated ground surfaces than their surrounding areas, but fell below the high ground break point, meaning that developing a more refined means of separating out areas of higher ground will likely increase the predictability of the elevation layer.

Of the 16 sites occurring in high or medium vegetation zones but not showing on high ground, 4 are on rivers, 1 on a small Gulf key, and 8 are on tree islands along the western edge of the prairies near the wide Gulf coast mangrove zone. Others are poorly known sites with unverified coordinates. It should also be noted that of these 16 sites 5 were located in Red or Black Mangroves, 1 was in Mixed Scrub surrounded by mangroves, 4 were in Buttonwood Forest, 3 were in Bay-Hardwood Scrub, 1 was in Cabbage Palm Forest, and 1 was in Willows.

Looking more closely at the 18 sites that coincide with the higher ground layer but not with the high or medium vegetation zones, 4 are larger sites situated alongside rivers in the 10,000 Islands district. All 4 were farmed historically and are now dominated by Brazilian Pepper, an exotic species. The 3 sites in the Flamingo-Cape Sable area are in Buttonwood Forest. The remaining sites fall in Cabbage Palm Forest, Black Mangrove, Red Mangrove, Halophytic Herbaceous Prairie, Succulents, Buttonwood Scrub, and Bay-Hardwood Scrub. This would suggest that future phases of this study might approach prediction models for specific districts within the park. For example, models might include Brazilian Pepper zones along the Gulf coast and Buttonwood zones closer to Florida Bay.

Considering the fact that elevation data is lacking for more than half of the sites in the sample, perhaps the most prudent question for this first attempt to model site distributions for this study is "How well does vegetation alone predict the 141 sites that lack elevation data?" Most of these sites are situated on tree islands in the grass marshes and prairies. In fact, 122, or 86.5 percent, are in the high probability vegetation zones and another 7 are in the medium category, for a total of 91.4 percent. Because surveys in this area have focused largely on tree islands, mostly in the Shark River Slough, this result is not surprising. But, because there is an fundamental correlation between vegetation and relative elevation, it is very likely an accurate predictor of what to expect during future surveys of the many more acres in Shark River Slough now classified as Subtropical Hardwood Hammock and Bayhead that have yet to be searched for sites, as well as those same zones found in the prairies to its west, in the central pinelands, and in Taylor Slough.

Survey Methods and Sampling Strategy

Survey Methods

In 2004, the Florida Division of Historical Resources (FDHR) issued its current *Guidelines for Use by Historic Preservation Professionals*, wherein the State of Florida's standards for conducting Phase I cultural resource assessment surveys are outlined. The survey methodology prescribed within the FDHR *Guidelines* calls for systematic shovel testing at 25 m intervals within high probability zones, 50 m intervals in moderate probability zones, and 100 m intervals in low probability zones (FDHR 2004:16). By excavating shovel tests at 100 m intervals, EVER can fulfill Florida state standards for Phase I inventories for most areas of the park, by virtue of their categorization as low to very low site probability areas. But in doing so, the likelihood of missing subsurface archeological sites smaller than 50 m across, should they be present, is extremely high (Nance and Ball 1986; Lightfoot 1986; Shott 1989).

Regionwide Archeological Survey Program (RASP) survey standards for Section 110 inventory projects (Prentice 2007), which will be followed by SEAC personnel under the currently proposed survey strategy, will consist of shovel testing at 20 m intervals in all zones, thereby exceeding all FDHR requirements and providing a more rigorous means of evaluating the veracity of current site prediction models for areas categorized as having lower site probability. In all other aspects the standard RASP shovel testing methodology duplicates that required by the state in that shovel tests will be dug 50 cm in diameter and will cease at a depth of 1 m or upon reaching bedrock. Each shovel test will be documented on a shovel test excavation form and its location recorded with a GPS unit capable of submeter accuracy. Excavated soils will be screened using quarter inch mesh, and all recovered artifacts will be retained for analysis. The selection of areas for shovel test survey under the proposed survey methodology will be addressed below under the heading "Sampling Strategy."

In addition to conducting systematic shovel testing as per the sampling procedures discussed below, metal detector surveys will be conducted in areas where historic sites are considered most likely to occur and where ground surface conditions permit relatively unimpeded pedestrian movement. During metal detector surveys, detector operators will traverse survey areas along roughly parallel transects spaced approximately 20 m apart. Each metal detector operator will carry a GPS unit capable of 5 m accuracy to track the path taken by each operator during the survey to ensure relatively uniform survey coverage within the survey area. A GPS unit capable of submeter accuracy will be used to record the locations of all metallic artifacts encountered. Those deemed likely to represent historic objects will be retained for analysis while those considered to be modern refuse will be left at the point of discovery.

With respect to using the existing vegetation data to prioritize archeological surveys for prehistoric sites in the park, particularly those surveys tied to Section 106 compliance, it is recommended that in the unlikely event that any prescribed fires or ground modification activities are planned within the high

(Subtropical Hardwood Hammocks and Bayheads) or medium (Mixed Mangroves and Mud) probability zones that they be systematically shovel test surveyed at 20 m intervals for the presence of archeological sites prior to the undertaking. This is a recommendation only, however, as meeting state standards requires only shovel testing at 25 m intervals in high probability zones and 50 m intervals in moderate or medium probability zones.

In terms of inventorying the potentially most significant prehistoric sites that have yet to be identified within the park from a purely Section 110 inventory perspective, priority should be given to shovel testing the high probability zones, particularly the Subtropical Mangrove Hammocks located in the coastal mangrove areas where hurricanes and coastal erosion threaten their preservation. Again, testing at 20 m intervals is recommended to meet RASP survey standards, but shovel testing at 25 m intervals will meet state requirements.

Sampling Strategy

The EVER survey sampling strategy proposed here will implement three approaches. The first approach will be to conduct metal detector surveys in those areas where two as-yet-unidentified nineteenth century military forts and encampments have been predicted as having the highest probability of occurring within the park based on current GIS projections of historic maps. Both sites are most likely to occur in areas that have been categorized as high probability hardwood hammock areas. In the case of Fort Westcott (see Figure 5), the hardwood hammock tree islands located in Shark River Slough within a 3000 m radius of Mosquito Island (EVER-66) are considered the highest probability locations for containing this site with EVER-66 being a very likely candidate for being Fort Westcott. With respect to Camp Hunter, Papaya Hammock is the most likely location for its future discovery. These predictions are based on the various GIS projections that have been made of the 1846 Bruff and 1856 Ives maps, particularly a projection of the 1856 Ives map where Fort Poinsette has been aligned with Cape Sable and Fort Henry has been aligned with the 8DA3223 site.

The second proposed approach will consist of metal detector survey followed by shovel testing at 20 m intervals in 100-by-100 m blocks in both specifically targeted and randomly chosen areas bordering roadways with an emphasis on surveying areas adjacent to fire roads in the Pinelands Fire Unit near Long Pine Key. The Rock Reef Pass/Pine Glades Lake area will be specifically targeted using this approach in the attempt to identify the location of the Willie Jim East Coast Seminole camp shown on the 1930 Nash map in this general vicinity (see Figure 11). This approach will simultaneously sample vegetation zones categorized as low to very low probability areas and will allow for the evaluation of proximity to historic roads as a factor in predicting the presence of historic sites, which *a priori* logic would suggest is a reasonable expectation. It will also allow the potential for sampling of a variety of vegetation zones at all times of the year without subjecting survey crews to long, unbearable work conditions or harsh environmental situations that would make extrication and seeking of relief or medical treatment difficult.

The third survey approach will consist of a combination of both metal detector survey and 20 m interval shovel testing in either randomly chosen or opportunistically available 100-by-100 m survey blocks located within remote, lower probability areas where access by all-terrain vehicle, air boat, or helicopter is required. These surveys will be undertaken when ground surfaces are not inundated and ground visibility is at least 50 percent (i.e., the vegetation does not obscure more than 50 percent of the ground surface); and, drawing on the lessons enumerated by the SEAC archeologists who conducted surveys at the park in the past, archeological inventories under this approach will be conducted during the winter season when cooler temperatures, infrequent storms, and low mosquito numbers are most conducive to conducting such field work. Given the difficulty of working in these environments under even the best of conditions, this third survey approach is offered as a reasonable effort to ensure proper consideration is given to the possibility that current predictive models have somehow underestimated the potential for sites in these environs.

Effectively implementing the third survey approach will require that EVER staff provide SEAC with timely and accurate reports of recently burned or otherwise cleared areas so these can be cross-referenced with the vegetation and high ground models currently available. EVER staff will also need to provide estimates of how long the improved visibility or window of opportunity is expected to last before vegetation regrowth or changing hydrological conditions makes survey efforts too difficult to undertake. Based on this information, the park's ability to provide logistical support for the field work within the estimated window of opportunity, and SEAC's ability to conduct the survey (i.e., survey funding is available, travel restrictions are not in place, and the timing doesn't conflict with SEAC's other project scheduling), then field work will be undertaken when deemed feasible. In the event these conditions cannot be met, the park's in-house cultural resource staff and archeologist can conduct the field work and share the results with SEAC to ensure incorporation of their survey data into subsequent assessments of the predictive model.

Conclusions

Until such time that higher resolution LiDAR data is available for the entire park, the only well-tested park-wide data set that is currently available for modeling EVER prehistoric site distribution is the UGA vegetation data, which is not as accurate as one would wish. Improvement in the accuracy of the existing UGA's vegetation zone classifications for the park may enhance and refine the use of this GIS data set as a highly predictive data set, but it will nonetheless remain only a proxy for inferring changes in elevation between zones and cannot provide the means of evaluating subtle changes in relative elevation within or across vegetation zones. At this juncture, it cannot be stressed enough how important it is for the park to obtain high resolution LiDAR-based elevation data for the entire park in order to provide a better means of delineating areas of higher ground, which is likely to be shown to be the single best predictor of site locations, with vegetation likely being a close second.

Based on the results of the initial surveys carried out under this survey strategy and the acquisition of better environmental data, the GIS model as it currently stands can be reevaluated and potentially refined. And, as modifications are made in the site prediction model, new or adjusted survey approaches and mitigation measures can be developed for Section 110 inventory and Section 106 compliance actions within the park. Most likely, this will mean developing more distinct GIS models for different physiographic zones because the relative importance of elevation and vegetation type will probably vary between them. This variation is likely to reflect not only suitable living areas, i.e., dry ground, but the available resources that were sought by the Everglade's American Indian inhabitants at different times in the past. For example, with further analysis the break points used to classify higher and lower ground might be shifted to include more areas under one category or another. Field observations may also provide suggestions for adding a certain type of water bodies such as ponds as a possible predictive factor. And, of course, should other GIS data become available, that can also be included in the analytical mix.

References Cited

Carr, Robert S.

2002 The Archaeology of Everglades Tree Islands. In *Tree Islands of the Everglades*, edited by Fred H. Sklar and Arnold van der Valk, pp. 187-206. Kluwer Academic Publishers, Dordrecht, Netherlands.

Ehrenhard, John E., Gregory Komara, and Robert C. Taylor

1982 *Everglades National Park, Cultural Resource Inventory Interim Report Season 1*. National Park Service, Southeast Archeological Center, Tallahassee.

Griffin, John W.

1965 *Archeological Survey, Everglades National Park, January 1964*. Manuscript on file, National Park Service, Southeast Archeological Center, Tallahassee.

1988 *The Archeology of Everglades National Park: A Synthesis*. National Park Service, Southeast Archeological Center, Tallahassee.

Hammond, James

2008 *A Final Report on the Army Forts South of the Caloosahatchee River during the 2nd and 3rd Seminole Wars*. Manuscript on file, State of Florida Master Site File, Tallahassee.

Lightfoot, Kent G.

1986 Regional Surveys in the Eastern United States: The Strengths and Weaknesses of Implementing Subsurface Testing Programs. *American Antiquity* 51(3):484-504.

Nash, Roy

1931 *Survey of the Seminole Indians of Florida*. U.S. Government Printing Office, Washington, D.C.

Nance, Jack D., and Bruce F. Ball

1986 No Surprises? The Reliability and Validity of Test Pit Sampling. *American Antiquity* 51(3):457-483.

Prentice, Guy

2007 *Standard Field Procedures Manual For The Southeast Archeological Center's Regionwide Archeological Survey Program*. National Park Service, Southeast Archeological Center, Tallahassee.

Russo, Mike and Whitney Anderson

1984 Chapter 10: Zooarchaeology of Tree Islands. In *Archeological Assessment of the Eastern Everglades Expansion Area, Everglades National Park, FL, Volume I*, by Margo Schwadron, pp 253-304. National Park Service, Southeast Archeological Center, Tallahassee.

Schwadron, Margo

2006 *Report On Archeological Survey Of Lands Proposed For Exchange From The Eastern Everglades Expansion Area, Everglades National Park, Fl.* National Park Service, Southeast Archeological Center, Tallahassee.

2009 *Archeological Assessment of the Eastern Everglades Expansion Area, Everglades National Park, FL, Volume I*. National Park Service, Southeast Archeological Center, Tallahassee.

Shott, Michael J.
1989 Shovel-Test Sampling in Archeological Survey: Comments on Nance and Ball and Lightfoot. *American Antiquity* 54(2):396-404.

Smith, Greg C.
2008 *Cultural Resources Overview and Survey Strategy: Comprehensive Everglades Restoration Plan*. New South Associates, St. Augustine, Florida.

Taylor, Robert C.
1984 *Everglades National Park, Archeological Inventory and Assessment, Season 2*. National Park Service, Southeast Archeological Center, Tallahassee.

1985 *Everglades National Park, Archeological Inventory and Assessment Season 3: Interim Report*. National Park Service, Southeast Archeological Center, Tallahassee.

Welch, Roy, Marguerite Madden, and Robert F. Doren
1999 *Mapping the Everglades*. Photogrammetric Engineering & Remote Sensing 65(2):163-170.

Widmer, Randolph J.
1988 *The Evolution of the Calusa, a Nonagricultural Chiefdom on the Southwest Florida Coast*. University of Alabama Press, Tuscaloosa.

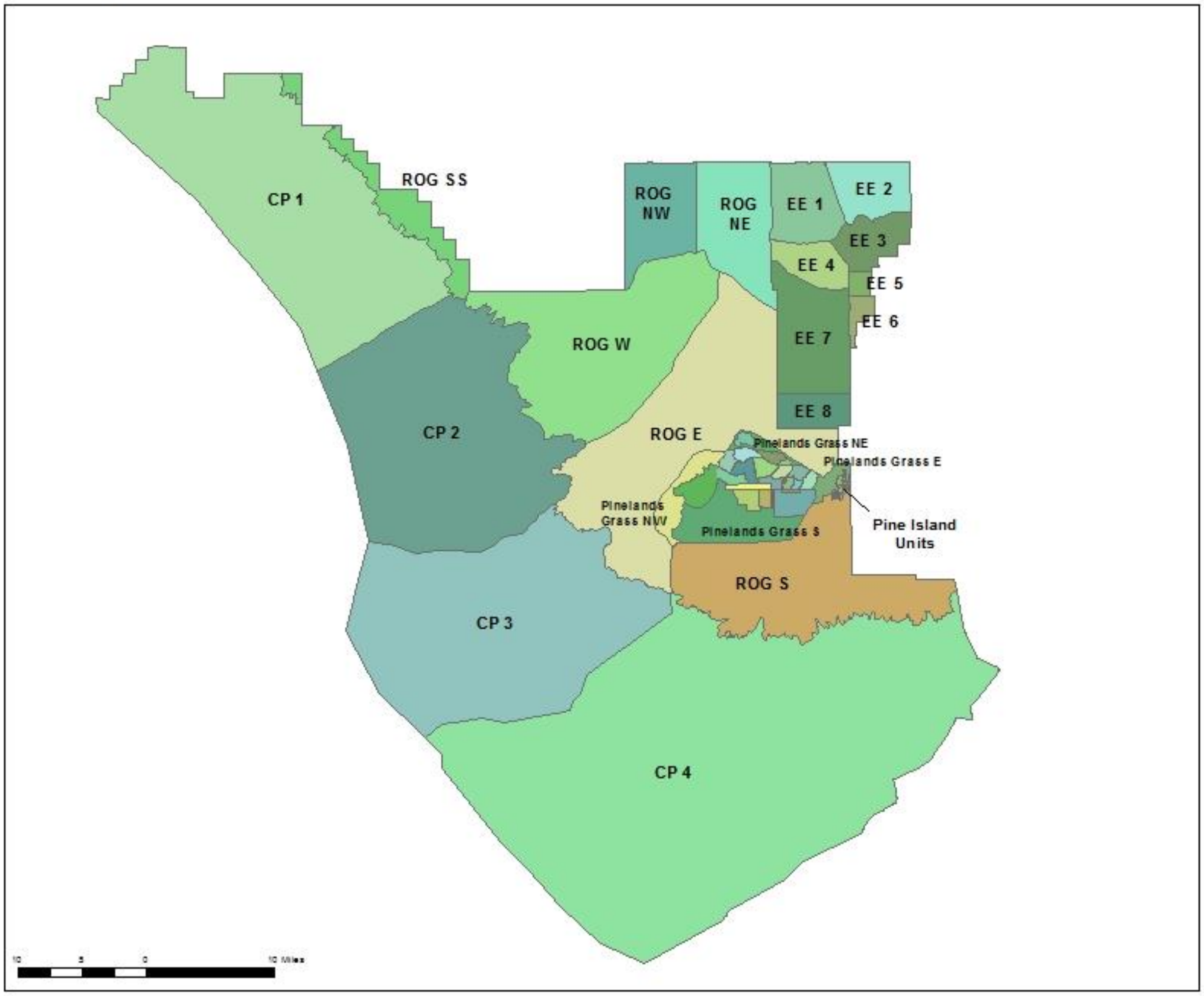
APPENDIX C

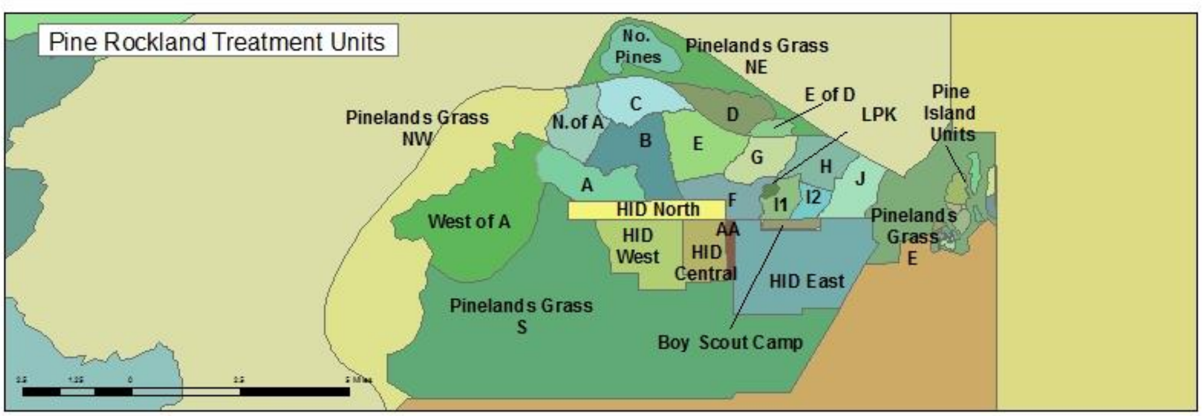
Multi-Year Fuels Treatment Plan: Representative Scope of Work

Everglades National Park
Florida

National Park Service
U.S. Department of the Interior

Multi-year Treatment Units





Everglades Fire and Aviation Management
2014

Multi-Year Fuels Plan Acres

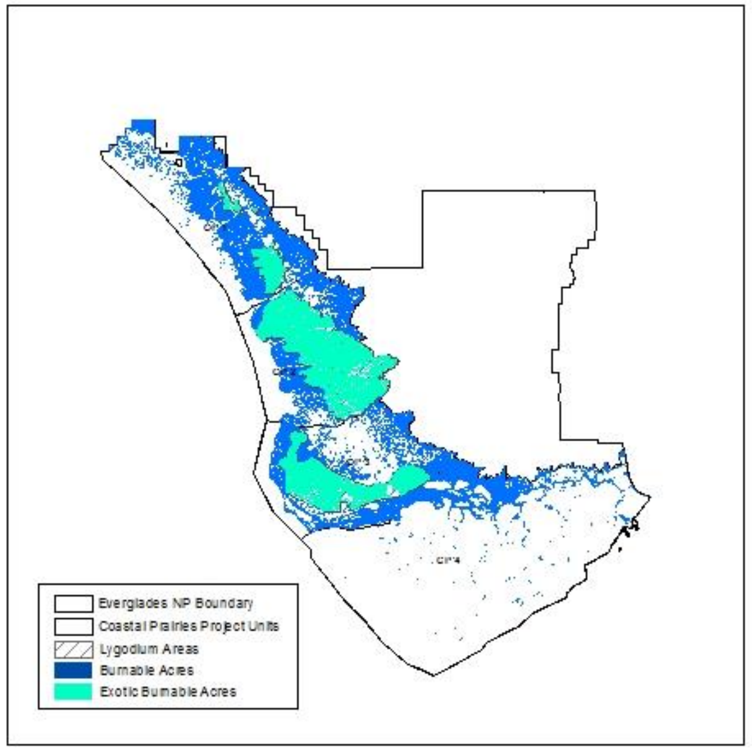
Year	FMU	Unit	WUI/HF/Exotics	Total Acres
Year 1	Pinelands	Block B	HF	1,562
		Block J	HF	867
		Block AA	HF	162
	Pinelands WUI	Block D	WUI	967
		Block G	WUI	791
		Block I1	WUI	424
		Block K	WUI	193
		Block L	WUI	113
		Block M	WUI	82
		HID C	WUI/Exotics	894
		Pinelands Grass E	WUI	3,147
	River of Grass	ROG SS	HF	19,909
		ROG E	HF	608
		ROG W	HF	9,898
		ROG S	WUI	49,043
	East Everglades	EE 3	WUI	11,660
		EE4	WUI	9,673
		EE8	WUI	10,004
	Coastal Prairies	CP 1	HF	42,737
		CP 2 Exotics	Exotics	73,989
Total Year 1				**236,723**
Year 2	Pinelands	Block A	HF	1,250
		Block C	HF	1,073
		Block F	HF	848
		Pinelands Grass S	HF	17,319
	Pinelands WUI	Block H	WUI	910
		Block R	WUI	20
		Block S	WUI	11
		Block T	WUI	40
		Block U	WUI	12
		Block V	WUI	103
		Block W	WUI	8
		Block X	WUI	30
		Block Y	WUI	63
		Boyscout Camp	WUI	205
	River of Grass	ROG E	HF	30,418
		ROG NE	WUI	35,026
		ROG S	WUI	14,017
	East Everglades	EE 6	WUI	2,721
		EE 7	WUI	35,531
	Coastal Prairies	CP 3	HF	42,737
		CP 1 Exotics	Exotics	13,433
		CP 2 Exotics	Exotics	12,608
		CP 3 Exotics	Exotics	47,948
Total Year 2				**256,331**

Year	FMU	Unit	WUI/HF/Exotics	Total Acres
Year 3	Pinelands	Block I2	HF	325
		Block WofA	HF	4,182
		Block NofA	HF	1,052
		E of D	HF	224
		HID W	HF/Exotics	1,710
		HID E	HF/Exotics	2,086
		Block NP	HF	916
		Pinelands Grass NW	HF	7,528
		Pinelands Grass NE	HF	1,710
	Pinelands WUI	Block E	WUI	1,391
		Block N	WUI	47
		Block O	WUI	33
		Block P	WUI	11
		Block Q	WUI	7
		LPK Campground	WUI	61
	River of Grass	ROG W	HF	30,418
		ROG S	WUI	21,039
		ROG NW	WUI	28,004
	East Everglades	EE 1	WUI	20,933
		EE 2	WUI	17,319
		EE5	WUI	2,169
	Coastal Prairies	CP 4	HF	42,737
		CP2 Exotics	Exotics	73,989
Total Year 3				**257,891**

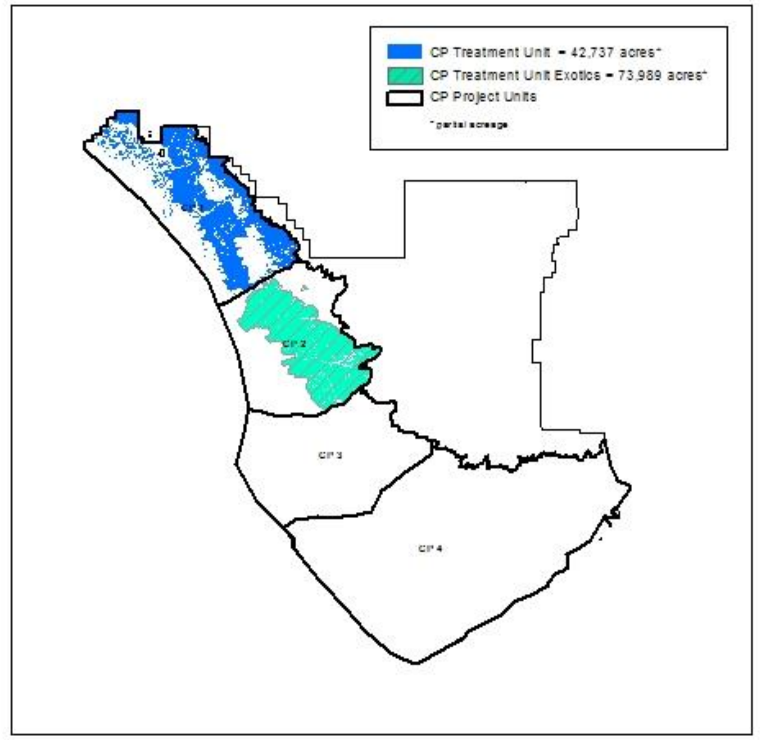
Year	FMU	Unit	WUI/HF/Exotics	Total Acres
Year 4	Pinelands	Block B	HF	1,562
		Block J	HF	867
		Block AA	HF	162
	Pinelands WUI	Block D	WUI	967
		Block G	WUI	791
		Block I1	WUI	424
		Block K	WUI	193
		Block L	WUI	113
		Block M	WUI	82
		HID C	WUI/Exotics	894
		Pinelands Grass E	WUI	3,147
	River of Grass	ROG E	HF	30,418
		ROG S	WUI	49,043
	East Everglades	EE 3	WUI	11,660
		EE 4	WUI	9,673
		EE 8	WUI	10,004
	Coastal Prairies	CP 2	HF	42,737
		CP1 Exotics	Exotics	13,433
		CP 2 Exotics	Exotics	12,608
		CP 3 Exotics	Exotics	47,948
Total Year 4				**236,726**
Year 5	Pinelands	Block A	HF	1,250
		Block C	HF	1,073
		Block F	HF	848
	Pinelands WUI	Block H	WUI	910
		Block R	WUI	20
		Block S	WUI	11
		Block T	WUI	40
		Block U	WUI	12
		Block V	WUI	103
		Block W	WUI	8
		Block X	WUI	30
		Block Y	WUI	63
		Boyscout Camp	WUI	205
		HID N	WUI/Exotics	1,001
	River of Grass	ROG W	HF	30,418
		ROG S	WUI	14,017
		ROG NE	WUI	35,026
	East Everglades	EE 6	WUI	2,721
		EE 7	WUI	35,531
	Coastal Prairies	CP 2 Exotics	Exotics	73,989
		CP1	HF	42,737
Total Year 5				**240,013**

* Total Units may be larger than proposed treatment area.

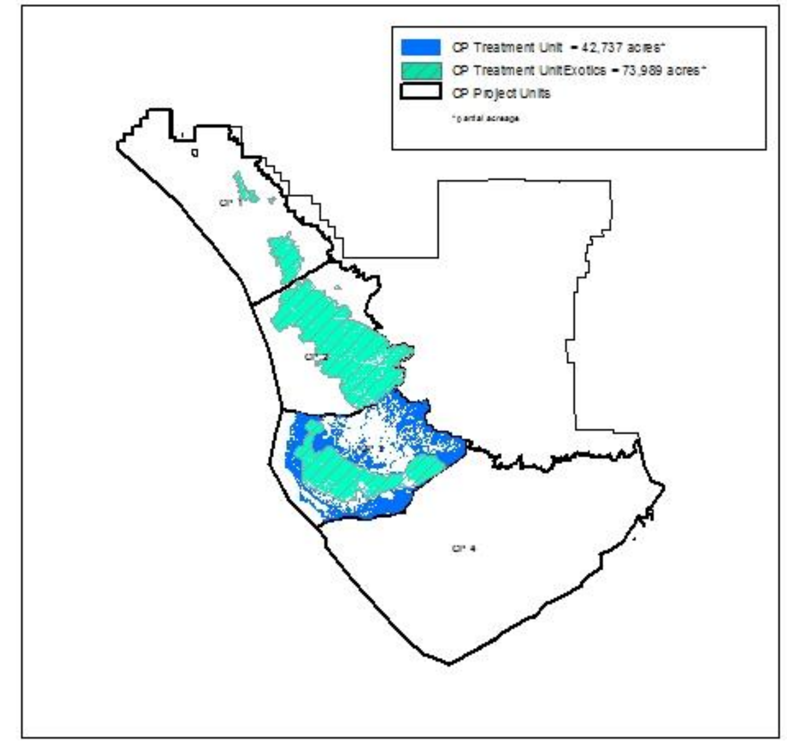
Coastal Prairies (CP)
Project Units



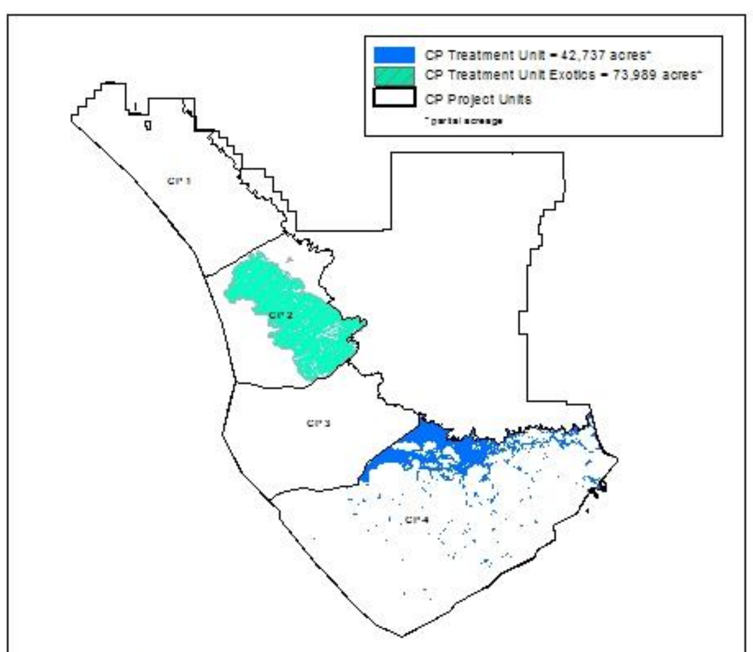
Year 1



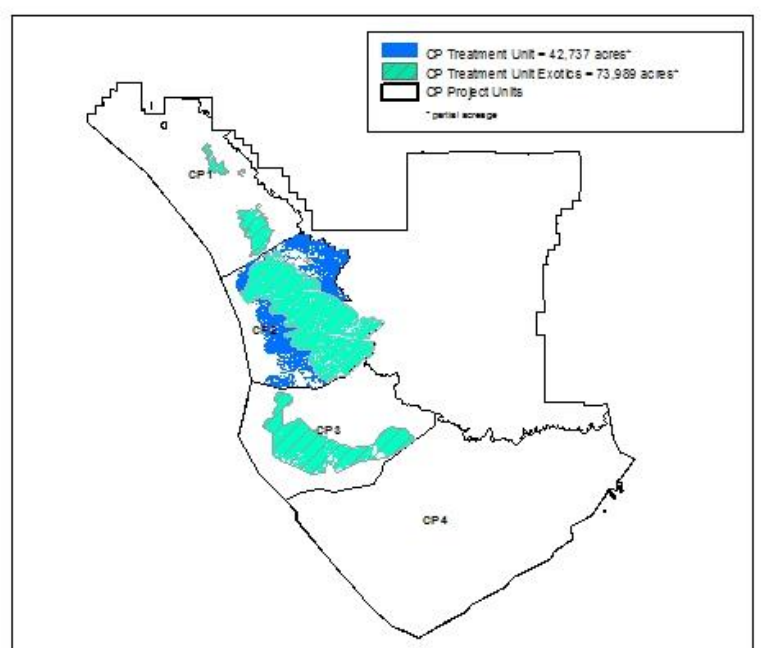
Year 2



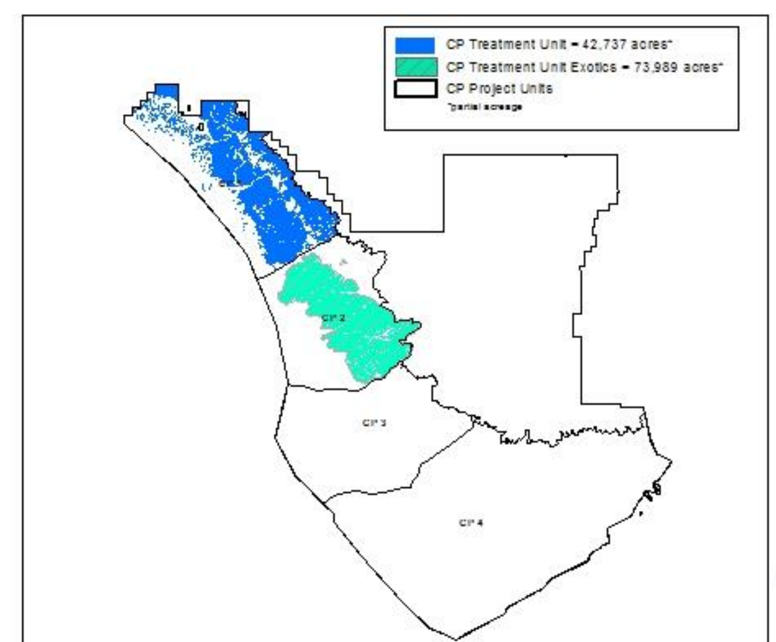
Year 3



Year 4



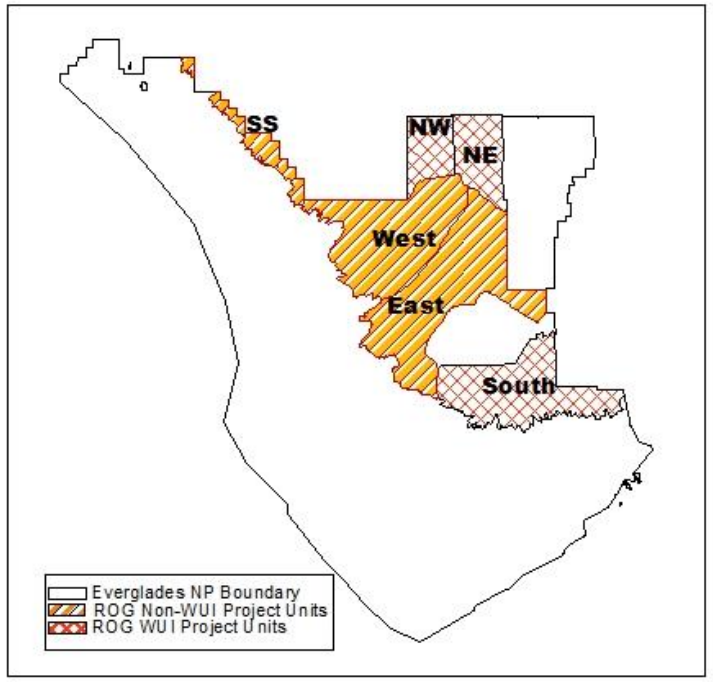
Year 5



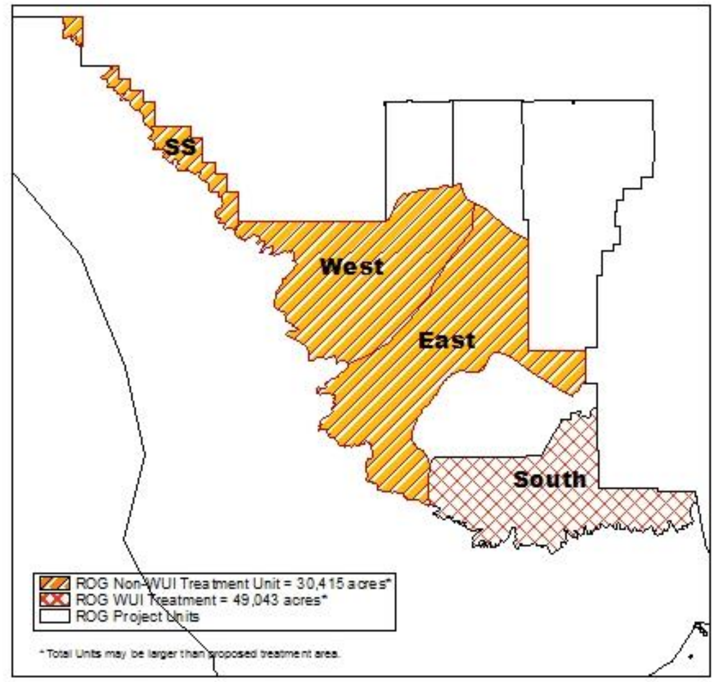
Everglades Fire Management
2014

Path: C:\GIS\Fuels_Plan_updates\5yr_Fuels_Plan_CoastalPrairies_11x17_land_08122014.mxd

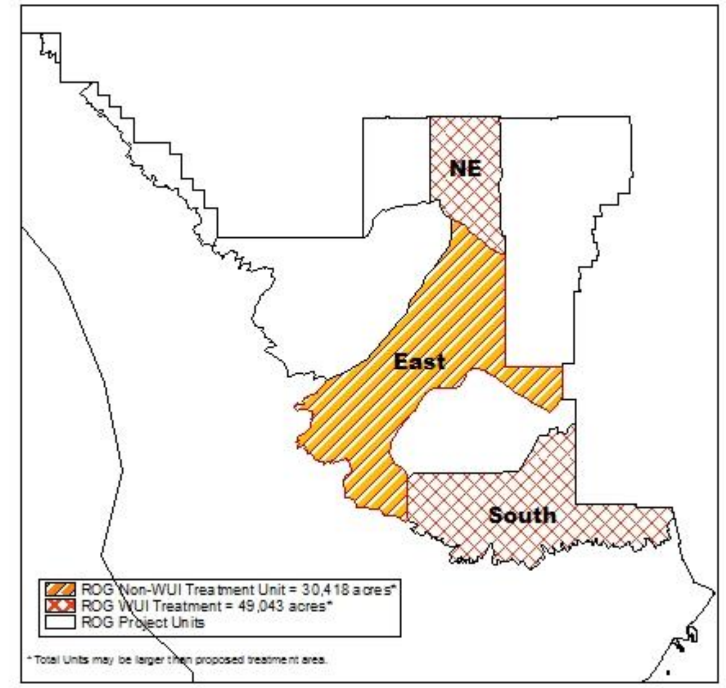
River of Grass (ROG) Project Units



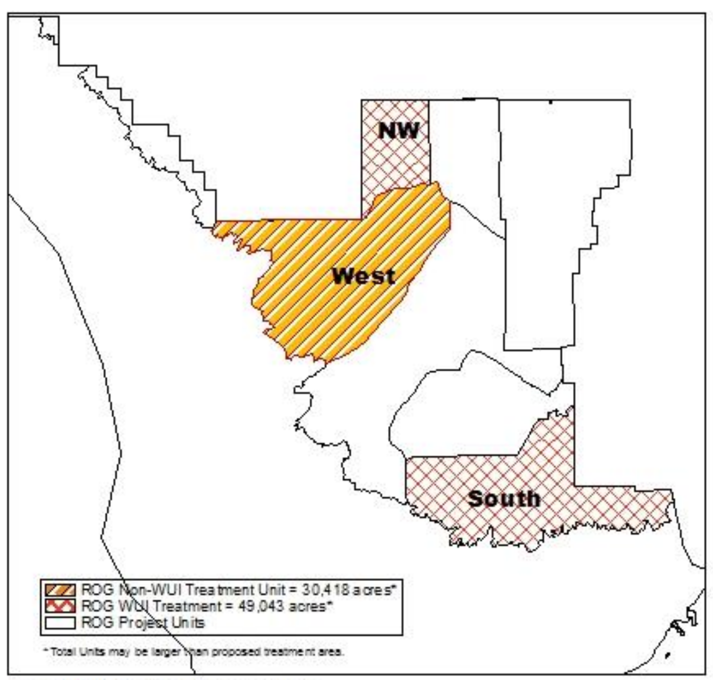
Year 1



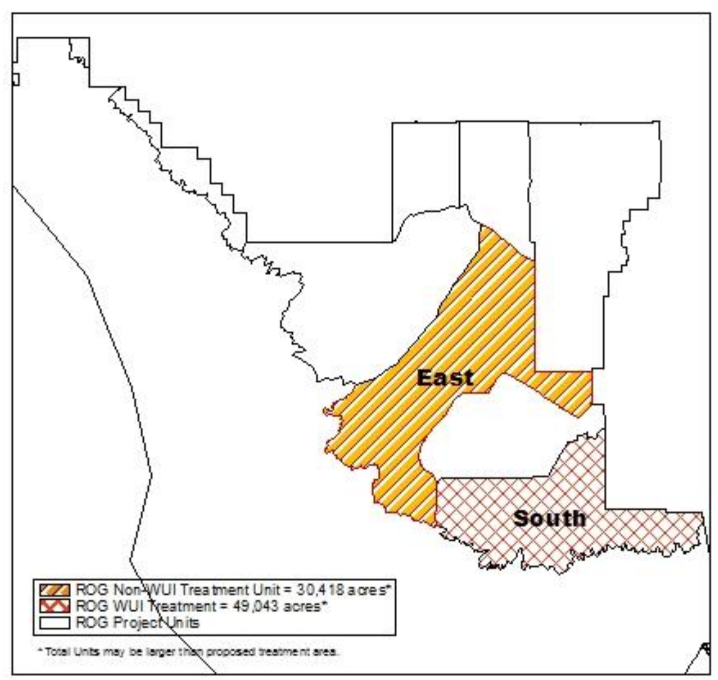
Year 2



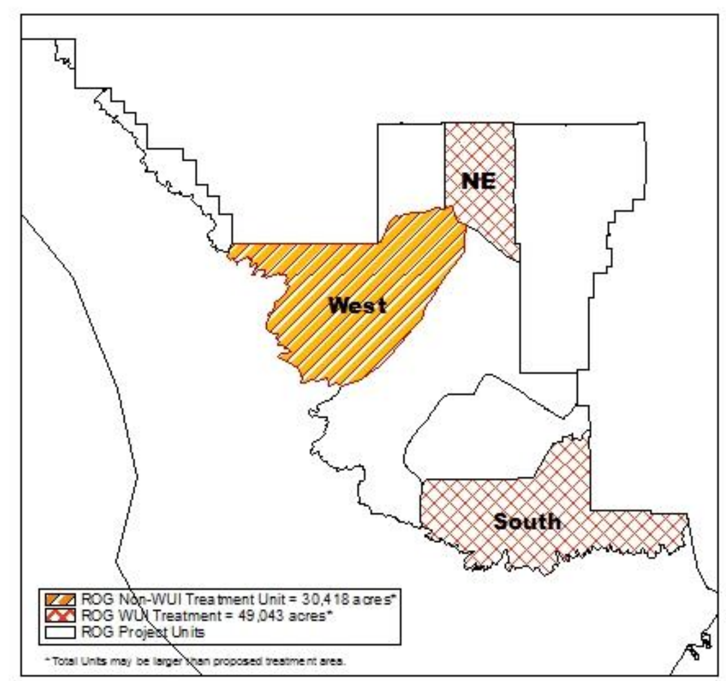
Year 3



Year 4



Year 5

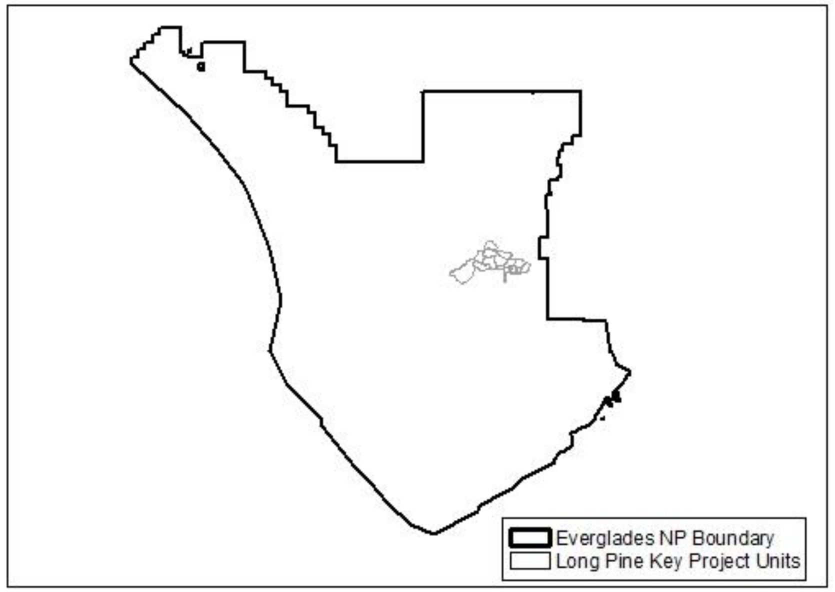


N
W E
S

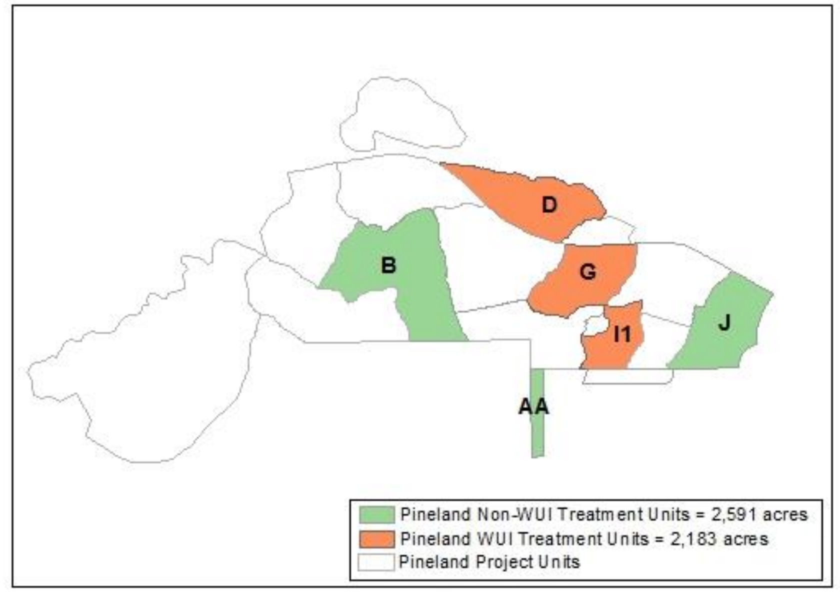
Everglades Fire Management
2014

Path: C:\GIS\Fuels_Plan_updates\5yr_Fuels_Plan_ROG_11x17_land_08122014.mxd

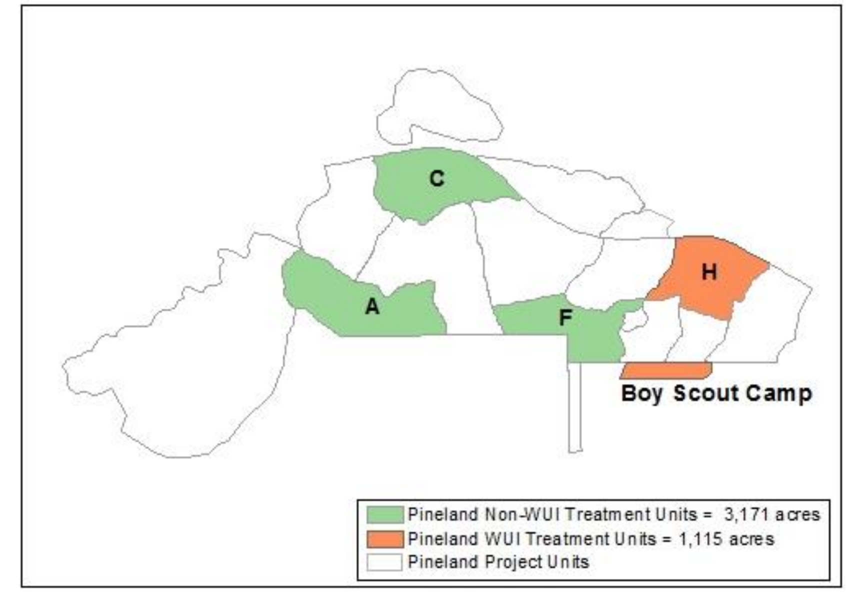
Pineland-Long Pine Key (LPK) Project Units



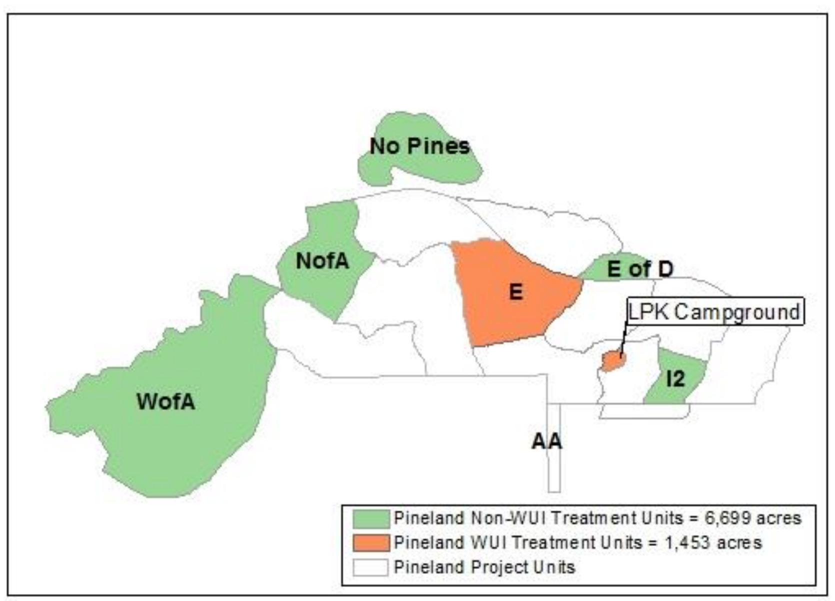
Year 1



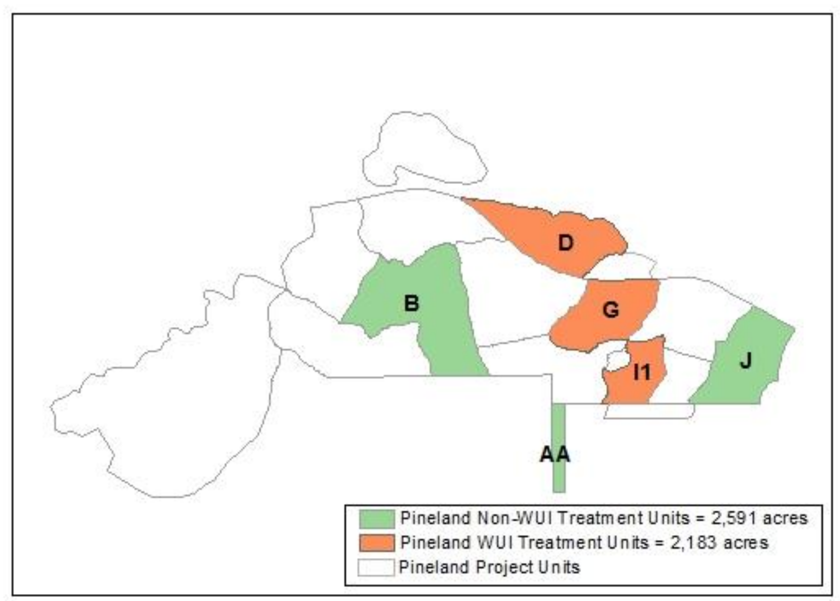
Year 2



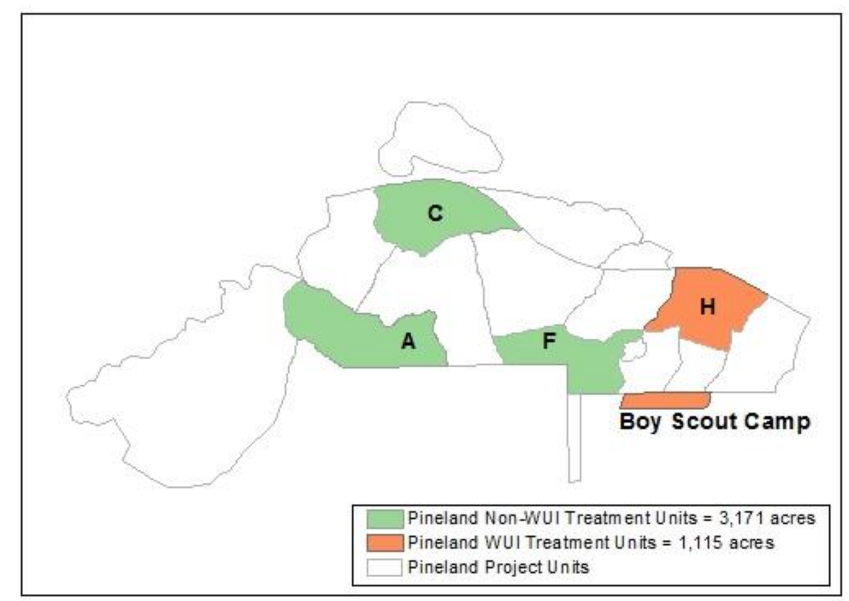
Year 3



Year 4



Year 5

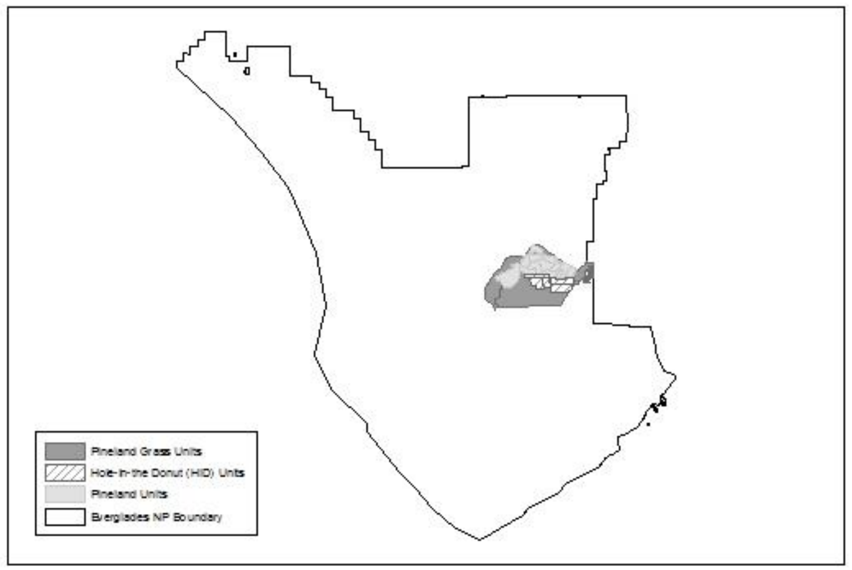


Everglades Fire Management
2014

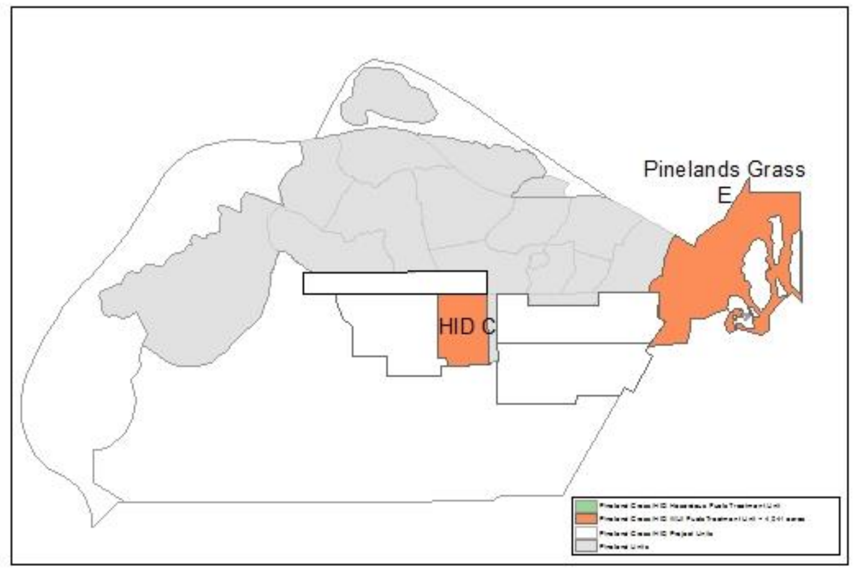
N
W E
S

Path: C:\GIS\Fuels_Plan_updates\5yr_Fuels_Plan_Pine_11x17_land_FY15_FY19_08112014.mxd

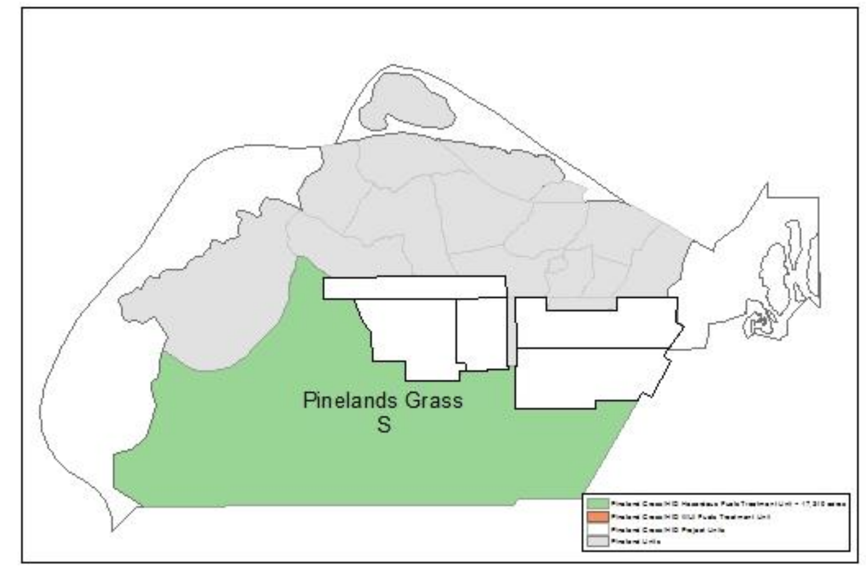
Pineland Grass /
Hole-in-the-Donut (HID)
Project Units



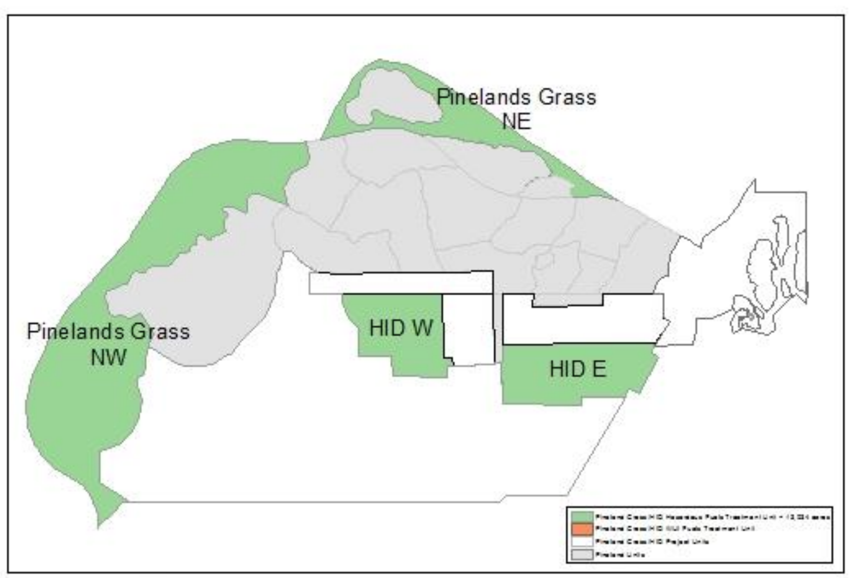
Year 1



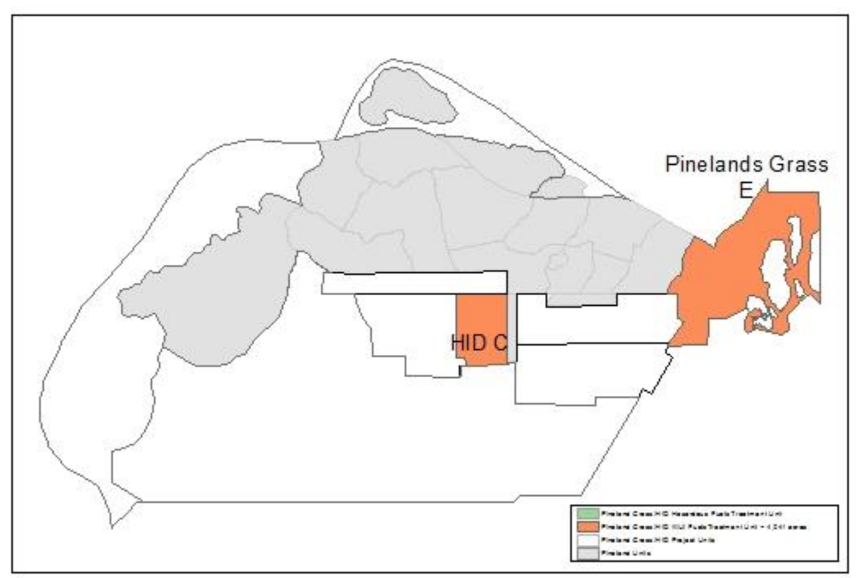
Year 2



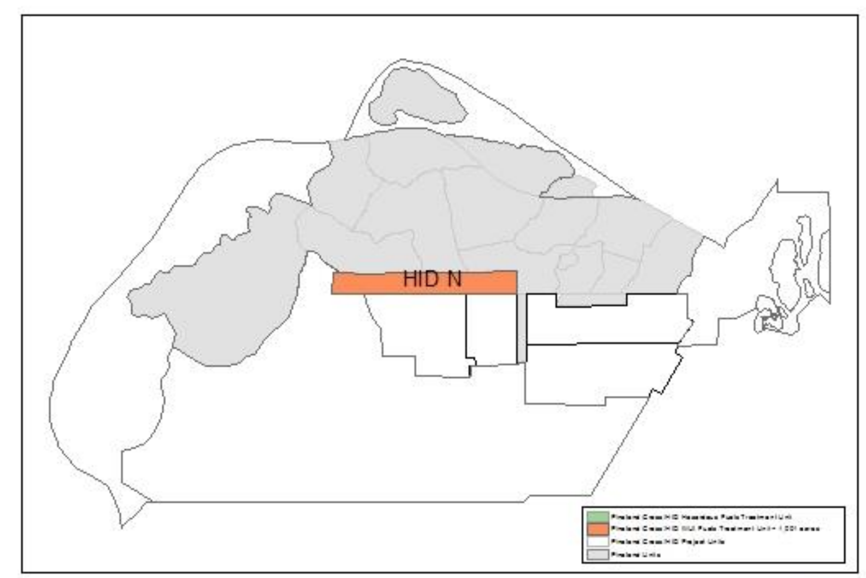
Year 3



Year 4



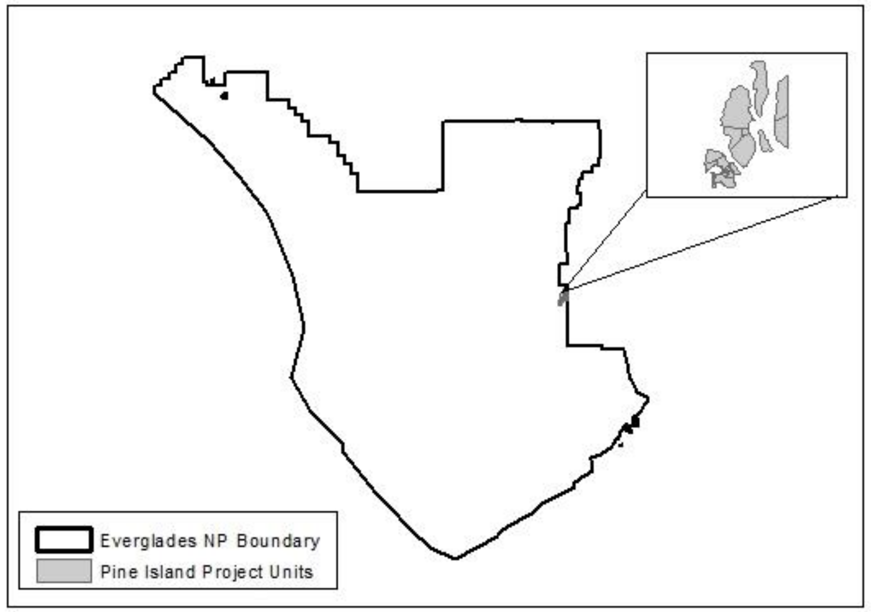
Year 5



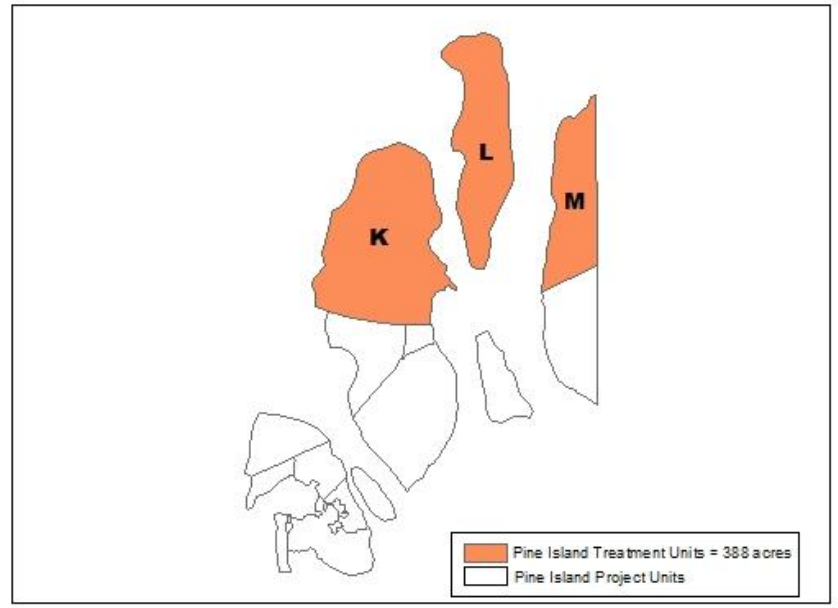
Everglades Fire Management
2014

Path: C:\GIS\Fuels_Plan_updates\5yr_Fuels_Plan_Pine_Grass_11x17_land_FY15_FY19_08112014.mxd

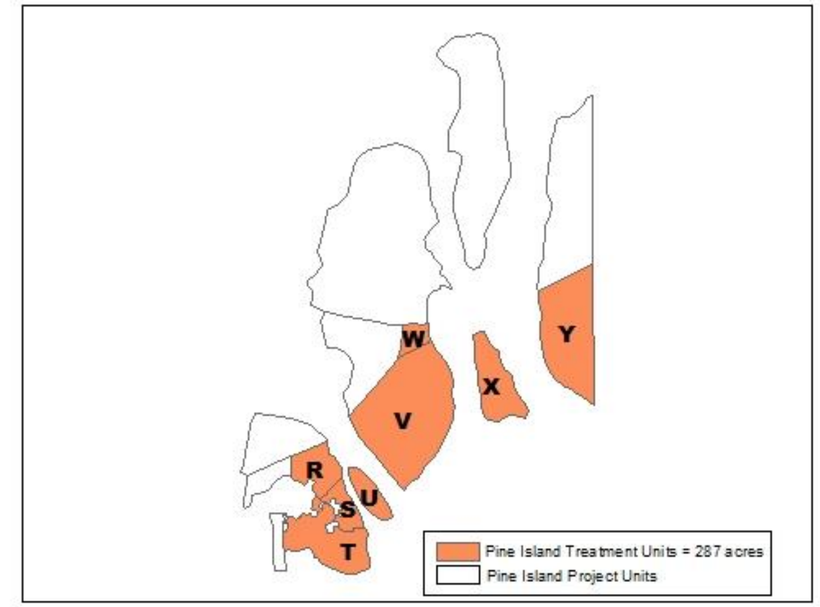
Pineland-Pine Island Project Units



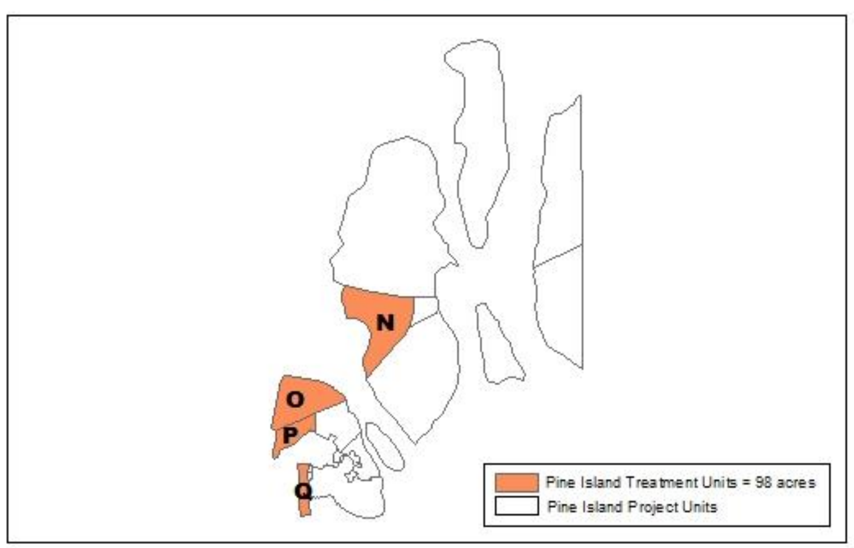
Year 1



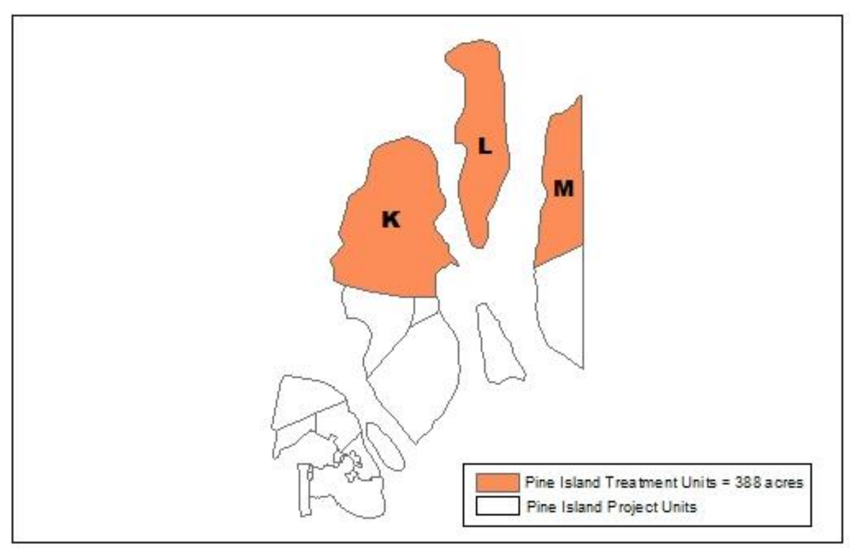
Year 2



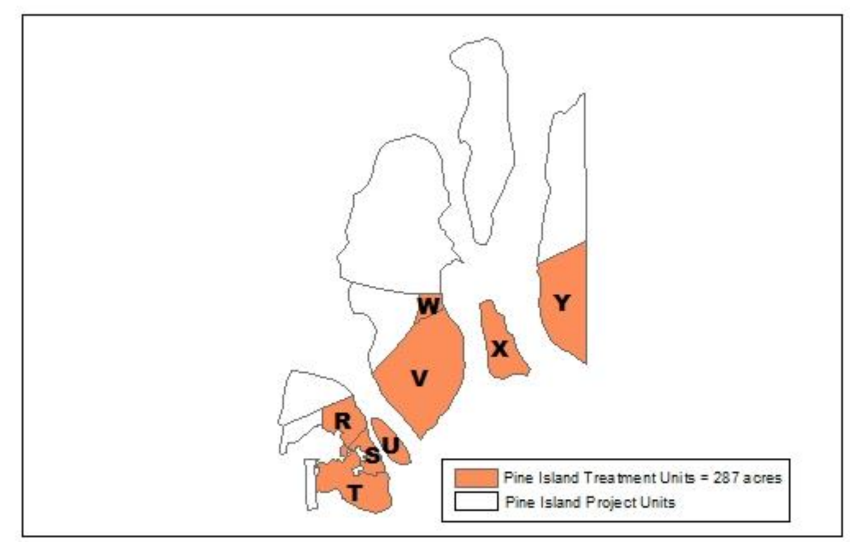
Year 3



Year 4



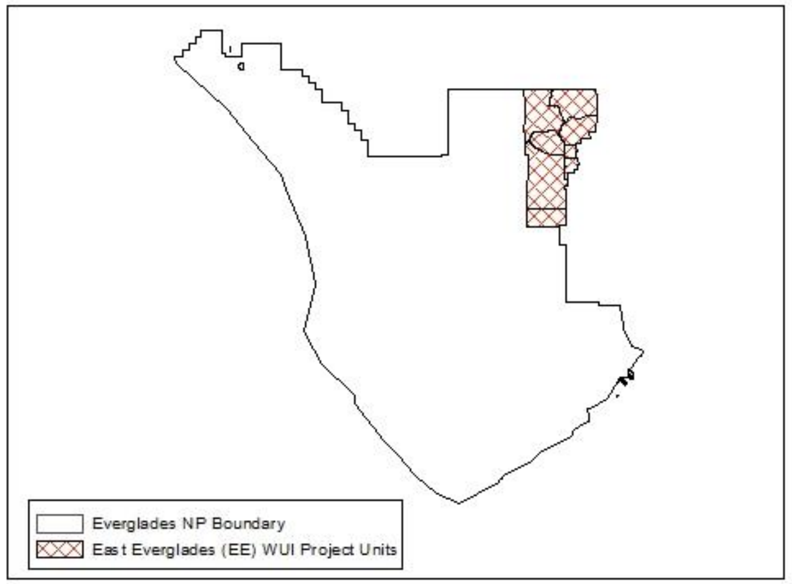
Year 5



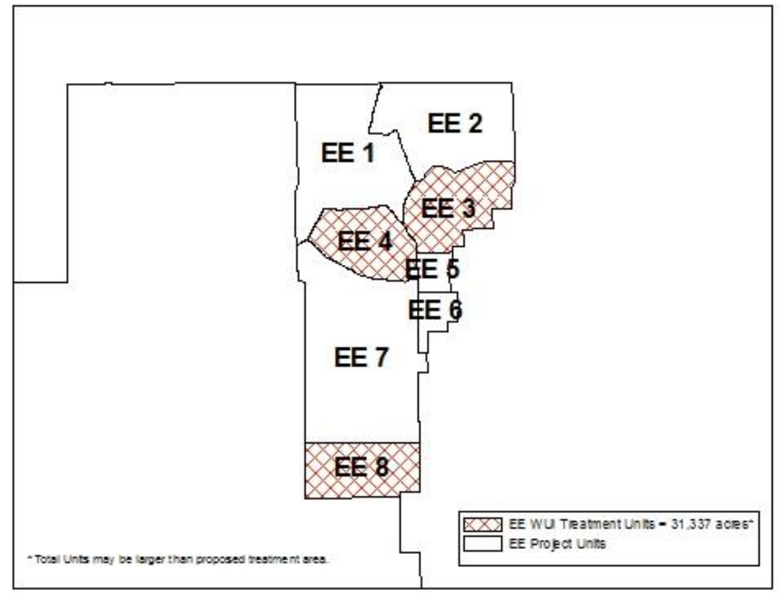
Everglades Fire Management
2014

Path: C:\GIS\Fuels_Plan_updates\5yr_Fuels_Plan_Pine_Island_11x17_land_FY15_FY19_08122014.mxd

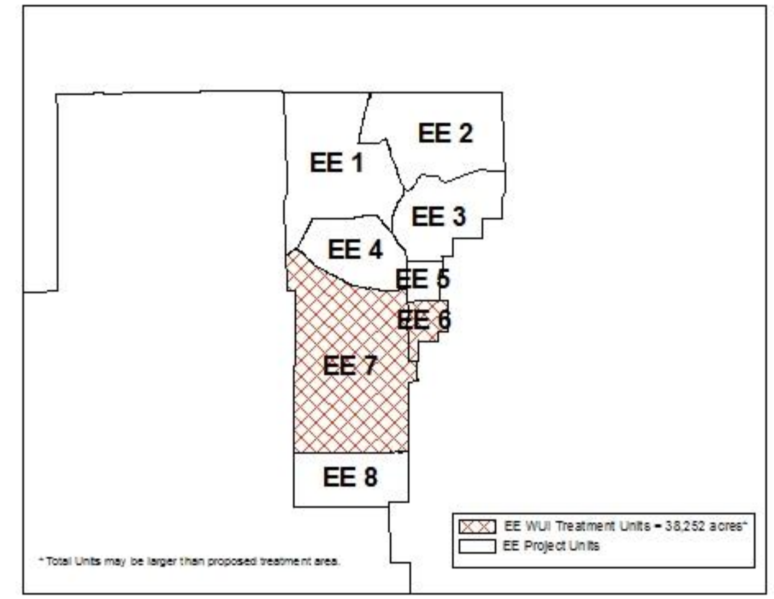
East Everglades Project Units



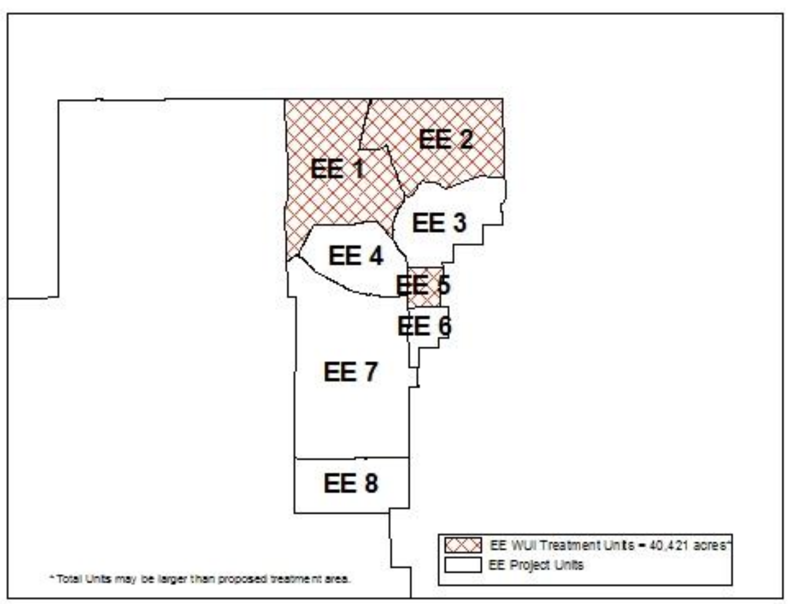
Year 1



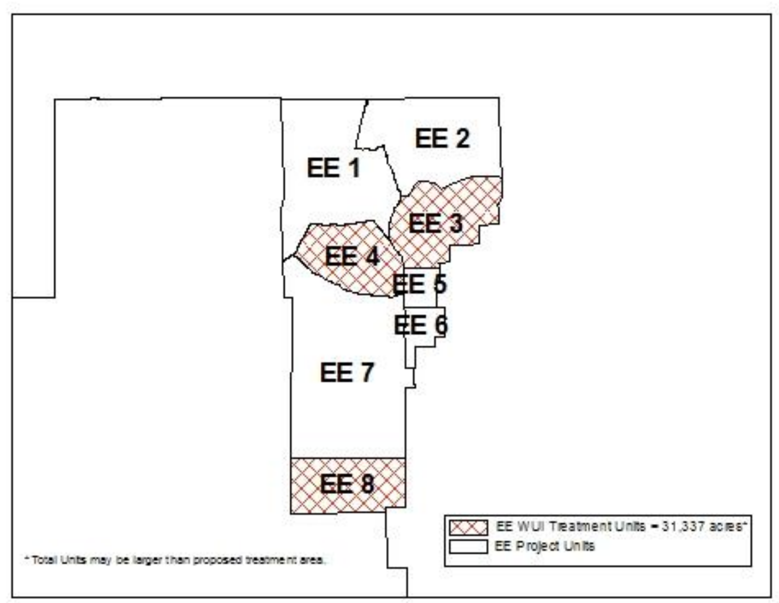
Year 2



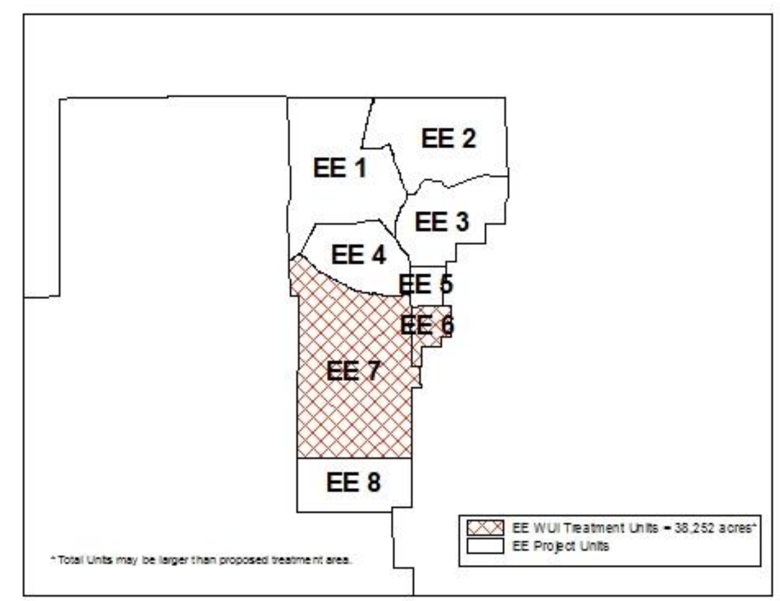
Year 3



Year 4



Year 5



Everglades Fire Management
2014

Path: C:\GIS\Fuels_Plan_updates\5yr_Fuels_Plan_EE_11x17_land_08122014.mxd

N
W E
S

Federally listed species considered for analysis in Fire management plan EA									
Common Name	**Scientific Name**	**Taxonomic group**	**State Status[1]**	**Federal Status[2]**	**Section 7 determination**	**Critical Habitat in EVER**	**Critical Habitat determination**	**Retained for detailed analysis**	**Justification for excluding from detailed analysis[3]**
Cape Sable seaside sparrow	Ammodramus maritimus mirabilis	Birds	FE	E	May Affect	Designated	May affect	Yes	N/A
Florida grasshopper sparrow	Ammodramus savannarum floridalis	Birds	FE	E	No Effect	No	N/A	No	1
Florida scrub-jay	Aphelocoma coerulescens	Birds	FT	T	No Effect	No	N/A	No	1
Red knot	Calidris canutus ssp. rufa	Birds	Not listed	PT	No Effect	No	N/A	No	2
Ivory-billed woodpecker	Campephilus principalis	Birds	FE	E	No Effect	No	N/A	No	3
Piping plover	Charadrius melodus	Birds	FT	T	No Effect	Designated	No effect	No	2
Kirtland's warbler	Dendroica kirtlandii	Birds	FE	E	No Effect	No	N/A	No	3
Wood stork	Mycteria americana	Birds	FE	E	May Affect	No	N/A	Yes	N/A
Red cockaded woodpecker	Picoides borealis	Birds	E	E	No Effect	No	N/A	No	3
Audubon's crested caracara	Polyborus plancus auduboni	Birds	T	T	No Effect	No	N/A	No	1
Everglade snail kite	Rostrhamus sociabilis plumbeus	Birds	FE	E	May Affect	Designated	May affect	Yes	N/A
Roseate tern	Sterna dougallii dougallii	Birds	FT	T	No Effect	No	N/A	No	2
Bachman's warbler	Vermivora bachmanii	Birds	FE	E	No Effect	No	N/A	No	3
Gulf sturgeon	Acipenser oxyrinchus desotoi	Fish	FT	T	No effect	No	N/A	No	N/A
Smalltooth sawfish	Pristis pectinata	Fish	FE	E	No Effect	Designated	No effect	No	2
Staghorn coral	Acropora cervicornis	Invertebrates	FT	T	No Effect	No	N/A	No	1
Elkhorn coral	Acropora palmata	Invertebrates	FT	T	No Effect	No	N/A	No	1
Florida leafwing butterfly	Anaea troglodyta floridalis	Invertebrates	Not listed	E	May Affect	Designated	May affect	Yes	N/A
Nickerbean blue butterfly	Cyclargus ammon	Invertebrates	FT(S/A)	T(SA)	N/A	No	N/A	No	4
Miami-blue butterfly	Cyclargus thomasi bethunebakeri	Invertebrates	FE	E	No Effect	No	N/A	No	3
Ceraunus blue butterfly	Hemiargus ceraunus antibubastus	Invertebrates	FT(S/A)	T(SA)	N/A	No	N/A	No	4
Schaus swallowtail butterfly	Heraclides aristodemus ponceanus	Invertebrates	FE	E	No Effect	No	N/A	No	1
Cassius blue butterfly	Leptotes cassius theonus	Invertebrates	FT(S/A)	T(SA)	N/A	No	N/A	No	4
Stock island tree snail	Orthalicus reses	Invertebrates	FT	T	May Affect	No	N/A	Yes	N/A
Bartram's hairstreak butterfly	Strymon acis bartrami	Invertebrates	Not listed	E	May Affect	Designated	May affect	Yes	N/A
Finback whale	Balaenoptera physlus	Mammals	FE	E	No Effect	No	N/A	No	1
North Atlantic right whale	Eubalaena glacialis	Mammals	FE	E	No Effect	No	N/A	No	1
Florida bonnetted bat	Eumops floridanus	Mammals	Endangered	E	May Affect	No	N/A	Yes	N/A
Humpback whale	Megaptera novaeangliae	Mammals	FE	E	No Effect	No	N/A	No	1
Caribbean monk seal	Monachus tropicalis	Mammals	FE	E	No Effect	No	N/A	No	1
Key Largo wood rat	Neotoma floridana smalli	Mammals	FE	E	No Effect	No	N/A	No	1

Federally listed species considered for analysis in Fire management plan EA

Common Name	Scientific Name	Taxonomic group	State Status[1]	Federal Status[2]	Section 7 determination	Critical Habitat in EVER	Common Name	Scientific Name	Taxonomic group
Key deer	Odocoileus virginianum clavium	Mammals	FE	E	No Effect	No	N/A	No	1
rice rat	Oryzomus palustris natator	Mammals	FE	E - Lower Keys pop.	No Effect	No	N/A	No	1
Key Largo cotton mouse	Peromyscus gossypinus allapaticola	Mammals	FE	E	No Effect	No	N/A	No	1
Sperm whale	Physeter macrocephalus	Mammals	FE	E	No Effect	No	N/A	No	1
Puma	Puma concolor	Mammals	FT(S/A)	T(SA)	N/A	No	N/A	No	4
Florida panther	Puma concolor coryi	Mammals	FE	E	May Affect	No	N/A	Yes	N/A
Lower Keys marsh rabbit	Sylvilagus palustris hefneri	Mammals	FE	E	No Effect	No	N/A	No	1
West Indian manatee	Trichecus manatus	Mammals	FT	T	May Affect	Designated	No effect	Yes	N/A
Crenulate lead plant	Amorpha crenulata	Plants	E	E	No Effect	No	N/A	No	1
Blodgett's silverbush	Argythamnia blodgettii	Plants	E	C	May Affect	No	N/A	Yes	N/A
Key deer	Odocoileus virginianum clavium	Mammals	FE	E	No Effect	No	N/A	No	1
rice rat	Oryzomus palustris natator	Mammals	FE	E - Lower Keys pop.	No Effect	No	N/A	No	1
Key Largo cotton mouse	Peromyscus gossypinus allapaticola	Mammals	FE	E	No Effect	No	N/A	No	1
Florida brickell-bush	Brickellia mosieri	Plants	E	C	No Effect	No	N/A	No	1
Big Pine partridge pea	Chamaecrista lineata var. keyensis	Plants	E	C	May Affect	No	N/A	Yes	N/A
Deltoid spurge	Chamaesyce deltoidea ssp. deltoidea	Plants	E	E	No Effect	No	N/A	No	1
Pineland Sandmat	Chamaesyce deltoidea ssp. pinetorum	Plants	E	C	May Affect	No	N/A	Yes	N/A
wedge spurge	Chamaesyce deltoidea ssp. serpyllum	Plants	E	C	No Effect	No	N/A	No	1
Garber's Sandmat	Chamaesyce garberi	Plants	E	T	May Affect	No	N/A	Yes	N/A
Cape Sable Thoroughwort	Chromolaena frustrata	Plants	E	E	No Effect	Designated	No effect	No	N/A
Florida semaphore cactus	Consolea corallicola	Plants	E	E	No Effect	No	N/A	No	1
Okeechobee gourd	Cucurbita okeechobeensis ssp. okeechobeensis	Plants	E	E	No Effect	No	N/A	No	1
Florida Prairieclover	Dalea carthaginensis var. floridana	Plants	E	C	No Effect	No	N/A	No	3
Twospike Crabgrass	Digitaria pauciflora	Plants	E	C	May Affect	No	N/A	Yes	N/A
Small's milkpea	Galactia smallii	Plants	E	E	No Effect	No	N/A	No	1
Johnson's seagrass	Halophila johnsonii	Plants	Not listed	T	No Effect	No	N/A	No	1
beach jacquemontia	Jacquemontia reclinata	Plants	E	E	No Effect	No	N/A	No	1
sand flax	Linum arenicola	Plants	E	C	No Effect	No	N/A	No	1
Carter's small-flowered flax	Linum carteri var. carteri	Plants	E	C	No Effect	No	N/A	No	1
Key tree cactus	Pilosocereus robinii	Plants	E	E	No Effect	No	N/A	No	1

Federally listed species considered for analysis in Fire management plan EA

Common Name	Scientific Name	Taxonomic group	State Status[1]	Federal Status[2]	Section 7 determination	Critical Habitat in EVER	Common Name	Scientific Name	Taxonomic group
tiny polygala	Polygala smallii	Plants	E	E	No Effect	No	N/A	No	1
Everglades Bully	Sideroxylon reclinatum ssp. austrofloridense	Plants	Not listed	C	May Affect	No	N/A	Yes	N/A
Florida bristle fern	Trichomanes floridanum ssp. punctatum	Plants	E	C	No Effect	No	N/A	No	3
Carter's mustard	Warea carteri	Plants	E	E	No Effect	No	N/A	No	1
American alligator	Alligator mississippiensis	Reptiles	FT(S/A)	T(SA)	N/A	No	N/A	No	4
Loggerhead sea turtle	Caretta caretta	Reptiles	FT	T	No Effect	Designated	No effect	No	5
Green sea turtle	Chelonia mydas	Reptiles	FE	E	No Effect	No	N/A	No	2
American crocodile	Crocodylus acutus	Reptiles	FT	T	May Affect	Designated	May affect	Yes	N/A
Leatherback sea turtle	Dermochelys coriacea	Reptiles	FE	E	No Effect	No	N/A	No	2
Hawksbill sea turtle	Eretmochelys imbricata	Reptiles	FE	E	No Effect	No	N/A	No	2
Gopher tortoise	Gopherus polyphemus	Reptiles	ST	C	May Affect	No	N/A	Yes	N/A
Kemp's ridley sea turtle	Lepidochelys kempii	Reptiles	FE	E	No Effect	No	N/A	No	2
Eastern indigo snake	Drymarchon corais couperi	Reptiles	FT	T	May Affect	No	N/A	Yes	N/A

State Status[1]: E=endangered; T=threatened; CE=commercially exploited; SSC=species of special concern; FE=Federally endangered; FT=Federally threatened FT(SA)=Federally threatened due to similarity of appearance

Federal Status[2]: E=endangered T=threatened C=candidate PE=Proposed endangered PT=Proposed threatened T(SA)=Threatened due to similarity of appearance

Justification for excluding from detailed analysis[3]

1. Does not occur in Everglades National Park

2. Not known to occur in areas where prescribed fire will be implemented under either alternative

3. Extirpated from Everglades National Park

4. Listed due to similarity of appearance. Protections extend to commerce only

5. Fire is unlikely in the area designated, and fire and operations will have no effect on the primary constituent elements

State listed species considered for analysis in fire management plan (does not include state listed species included in Federally listed species table)					
Common Name	**Scientific Name**	**Taxonomic group**	**State Status[1]**	**Retained for detailed analysis**	**Justification for excluding from detailed analysis[2]**
Limpkin	Aramus guarauna	Birds	SSC	Yes	N/A
Burrowing owl	Athene cunicularia	Birds	SSC	No	1
Snowy Plover	Charadrius nivosus (C. alexandrinus)	Birds	ST	No	2
Little blue heron	Egretta caerulea	Birds	SSC	Yes[1]	N/A
Reddish egret	Egretta rufescens	Birds	SSC	Yes[1]	N/A
Snowy egret	Egretta thula	Birds	SSC	Yes[1]	N/A
Tricolored heron	Egretta tricolor	Birds	SSC	Yes[1]	N/A
White ibis	Eudocimus albus	Birds	SSC	Yes[1]	N/A
Southeastern American kestrel	Falco sparverius paulus	Birds	ST	No	3
Florida sandhill crane	Grus canadensis pratensis	Birds	ST	Yes	N/A
American oystercatcher	Haematopus palliatus	Birds	SSC	No	2
Brown pelican	Lelecanus occidentalis	Birds	SSC	No	2
Osprey	Pandion haliaetus	Birds	SSC Monroe County	No	N/A
White crowned pigeon	Patagioenas leucocephala	Birds	ST	Yes	N/A
Roseate spoonbill	Platalea ajaja	Birds	SSC	Yes[1]	N/A
Black skimmer	Rhynchops niger	Birds	SSC	No	2
Least tern	Sterna antillarum	Birds	ST	No	2
Atlantic sturgeon	Acipenser oxyrinchus	Fish	SSC	No	2
mangrove rivulus	Rivulus marmoratus	Fish	SSC	No	2
Pillar coral	Dendrogyra cylindricus	Invertebrates	ST	No	2
Florida tree snail	Liguus fasciatus	Invertebrates	SSC	Yes	N/A
Florida mouse	Podomys floridanus	Mammals	SSC	No	4
Big Cypress fox squirrel	Sciurus niger avicennia	Mammals	ST	Yes	N/A
Everglades mink	Neovison vison evergladensis	Mammals	T	Yes	N/A
Dildo Cactus	Acanthocereus tetragonus	Plants	ST	No	2
Paurotis Palm	Acoelorraphe wrightii	Plants	T	No	5
Golden Leather Fern	Acrostichum aureum	Plants	T	No	2
Ray Fern	Actinostachys pennula	Plants	E	No	6
Fragrant Maidenhair	Adiantum melanoleucum	Plants	E	No	5
Brittle Maidenhair	Adiantum tenerum	Plants	E	No	5
Everglades Shy-leaf	Aeschynomene pratensis	Plants	E	Yes[2]	N/A

State listed species considered for analysis in fire management plan (does not include state listed species included in Federally listed species table)					
Common Name	Scientific Name	Taxonomic group	State Status[1]	Retained for detailed analysis	Justification for excluding from detailed analysis[2]
Colic Root	Aletris bracteata	Plants	E	Yes[2]	N/A
Mexican Alvaradoa	Alvaradoa amorphoides	Plants	E	Yes[2]	N/A
Wright's Pineland Fern	Anemia wrightii	Plants	E	Yes[2]	N/A
Pineland Allamanda	Angadenia berteroi	Plants	T	Yes[2]	N/A
Sea Lavender	Argusia gnaphalodes	Plants	E	No	2
Carter's Orchid	Basiphyllaea corallicola	Plants	E	Yes[2]	N/A
Pinepink	Bletia purpurea	Plants	T	Yes[2]	N/A
Smooth Strongbark	Bourreria cassinifolia	Plants	E	Yes[2]	N/A
Strongback	Bourreria succulenta	Plants	E	No	2
Spider Orchid	Brassia caudata	Plants	E	No	6
Locustberry	Byrsonima lucida	Plants	T	Yes[2]	N/A
Spicewood	Calyptranthes pallens	Plants	T	No	5
Myrtle-of-the-river	Calyptranthes zuzygium	Plants	E	No	5
Wild Cinnamon	Canella winterana	Plants	E	No	5
Powdery Catopsis	Catopsis berteroniana	Plants	E	No	5
Florida Strap Airplant	Catopsis floribunda	Plants	E	No	5
Cock's Comb	Celosia nitida	Plants	E	No	2
Iguana hackberry	Celtis iguanea	Plants	E	No	2
Spurge	Chamaesyce adenoptera ssp. pergamena	Plants	T	Yes[2]	N/A
Porter's Sandmat	Chamaesyce porteriana	Plants	E	Yes[2]	N/A
Sun-bonnet	Chaptalia albicans	Plants	T	Yes[2]	N/A
Southern Lip Fern	Cheilanthes microphylla	Plants	E	No	2
Hand Fern	Cheiroglossa palmata	Plants	E	No	2
Satinleaf	Chrysophyllum oliviforme	Plants	T	Yes[2]	N/A
Silver Palm	Coccothrinax argentata	Plants	T	Yes[2]	N/A
Coffee Colubrina	Colubrina arborescens	Plants	E	Yes[2]	N/A
Cuban Colubrina	Colubrina cubensis var. floridana	Plants	E	Yes[2]	N/A
Soldierwood, Nakedwood	Colubrina elliptica	Plants	E	No	2
Curacao Bush	Cordia globosa	Plants	E	No	5
Ground-holly	Crossopetalum ilicifolium	Plants	T	Yes[2]	N/A
Rhacoma	Crossopetalum rhacoma	Plants	E	Yes[2]	N/A
Florida Tree Fern	Ctenitis sloanei	Plants	E	No	7

State listed species considered for analysis in fire management plan (does not include state listed species included in Federally listed species table)					
Common Name	Scientific Name	Taxonomic group	State Status[1]	Retained for detailed analysis	Justification for excluding from detailed analysis[2]
Florida flatsedge	Cyperus filiformis	Plants	E	No	2
Cowhorn Orchid	Cyrtopodium punctatum	Plants	E	Yes[2]	N/A
Brown's Indian Rosewood	Dalbergia brownei	Plants	E	No	2
Caribbean Crabgrass	Digitaria dolichophylla	Plants	T	Yes[2]	N/A
Milkbark	Drypetes diversifolia	Plants	E	No	2
Guiana-plum	Drypetes lateriflora	Plants	T	No	2
Spurred Neottia	Eltroplectris calcarata	Plants	E	No	5
Dollar Orchid	Encyclia boothiana	Plants	E	No	5
Clamshell Orchid	Encyclia cochleata	Plants	E	No	5
Florida Butterfly Orchid	Encyclia tampensis	Plants	CE	No	5, 9
Dingy-Flowered Star Orchid	Epidendrum anceps	Plants	E	No	5
Umbrella Star Orchid	Epidendrum boricuarum	Plants	E	No	5
Night-blooming Orchid	Epidendrum nocturnum	Plants	E	No	5
Rigid Epidendrum	Epidendrum rigidum	Plants	E	No	5
Blacktorch	Erithalis fruticosa	Plants	T	No	2
Pineland Poinsettia	Euphorbia pinetorum	Plants	E	Yes[2]	N/A
Bindweed Dwarf Morning-Glory	Evolvulus convolvuloides	Plants	E	No	2
Princewood	Exostema caribaeum	Plants	E	No	2
Two-Keeled Hooded Orchid	Galeandra beyrichii	Plants	E	No	5
Coastal Mock Vervain	Glandularia maritima	Plants	E	No	5
Wild Cotton	Gossypium hirsutum	Plants	E	No	2
Florida Govenia	Govenia utriculata	Plants	E	No	6
West Indian Tufted Airplant	Guzmania monostachia	Plants	E	No	5
Prickly-apple	Harrisia simpsonii	Plants	E	No	2
Poeppig's Rosemallow	Hibiscus poeppigii	Plants	E	No	5
Manchineel	Hippomane mancinella	Plants	E	No	2
White Ironwood	Hypelate trifoliata	Plants	E	Yes[2]	N/A
Tawnyberry Holly	Ilex krugiana	Plants	T	Yes[2]	N/A
Delicate Ionopsis Orchid	Ionopsis utricularioides	Plants	E	No	2
Man-in-the-ground	Ipomoea microdactyla	Plants	E	Yes[2]	N/A
Rockland Morning Glory	Ipomoea tenuissima	Plants	E	Yes[2]	N/A
Pineland Morning Glory	Jacquemontia curtissii	Plants	T	Yes[2]	N/A

State listed species considered for analysis in fire management plan (does not include state listed species included in Federally listed species table)					
Common Name	Scientific Name	Taxonomic group	State Status[1]	Retained for detailed analysis	Justification for excluding from detailed analysis[2]
Skyblue Clustervine	Jacquemontia pentanthos	Plants	E	No	2
Joewood	Jacquinia keyensis	Plants	T	Yes[2]	N/A
Florida Shrub Thoroughwort	Koanophyllon villosum	Plants	E	Yes[2]	N/A
White Fenrose	Kosteletzkya depressa	Plants	E	No	2
Lantana	Lantana depressa var. sanibelensis	Plants	E	No	2
Florida Lantana	Lantana depressa var.depressa	Plants	E	Yes[2]	N/A
Carter's Flax	Linum carteri var. smallii	Plants	E	Yes[2]	N/A
Hollyleaf Fern	Lomariopsis kunzeana	Plants	E	No	5
Longgland Orchid	Macradenia lutescens	Plants	E	No	6
Wild Dilly	Manilkara jaimiqui ssp. emarginata	Plants	T	No	2
Gutta-percha Mayten	Maytenus phyllanthoides	Plants	T	No	2
small-leaf squarestem	Melanthera parvifolia	Plants	T	Yes[2]	N/A
Clinging Vine Fern	Microgramma heterophylla	Plants	E	No	5
Simpson Stopper	Myrcianthes fragrans	Plants	T	Yes[2]	N/A
Sword Fern	Nephrolepis biserrata	Plants	T	Yes[2]	N/A
Wild Basil	Ocimum campechianum	Plants	E	Yes[2]	N/A
Wedgelet Fern	Odontosoria clavata	Plants	E	Yes[2]	N/A
Burrowing Four-O'Clock	Okenia hypogaea	Plants	E	No	2
Florida Dancinglady Orchid	Oncidium floridanum	Plants	E	Yes[2]	N/A
Prickly-pear	Opuntia stricta var. dillenii	Plants	T	Yes[2]	N/A
Prickly-pear	Opuntia stricta var. stricta	Plants	T	Yes[2]	N/A
Coral Panicum	Paspalidium chapmanii	Plants	E	No	2
Whiteflower Passionflower	Passiflora multiflora	Plants	E	No	2
Pineland Passionflower	Passiflora pallens	Plants	E	No	5
Goatsfoot	Passiflora sexflora	Plants	E	No	5
Mangrove Mallow	Pavonia paludicola	Plants	E	No	2
Plumy Polypody	Pecluma plumula	Plants	E	No	5
Low Peperomia	Peperomia humilis	Plants	E	No	2
Peperomia	Peperomia obtusifolia	Plants	E	No	2
Southern Fogfruit	Phyla stoechadifolia	Plants	E	Yes[2]	N/A
Black-bead	Pithecellobium keyense	Plants	T	Yes[2]	N/A
Flor De Llanten	Pleurothallis gelida	Plants	E	No	6

State listed species considered for analysis in fire management plan (does not include state listed species included in Federally listed species table)					
Common Name	**Scientific Name**	**Taxonomic group**	**State Status[1]**	**Retained for detailed analysis**	**Justification for excluding from detailed analysis[2]**
Ghost Orchid	Polyradicion lindenii	Plants	E	No	8
Yellowspike Orchid	Polystachya concreta	Plants	E	No	5
Britton's Shadow Witch	Ponthieva brittoniae	Plants	E	Yes[2]	N/A
Small Prescott Orchid	Prescottia oligantha	Plants	E	No	8
West Indian Cherry	Prunus myrtifolia	Plants	T	Yes[2]	N/A
Long-stalked Stopper	Psidium longipes	Plants	T	Yes[2]	N/A
Bahama Ladder Brake	Pteris bahamensis	Plants	T	Yes[2]	N/A
Darlingplum	Reynosia septentrionalis	Plants	T	No	2
Mistletoe Cactus	Rhipsalis baccifera	Plants	E	No	6
Small-leaf Snoutbean	Rhynchosia parvifolia	Plants	T	Yes[2]	N/A
Royal Palm	Roystonea elata	Plants	E	No	5
Bahama Sachsia	Sachsia polycephala	Plants	E	Yes[2]	N/A
Beach-berry	Scaevola plumieri	Plants	T	No	2
Florida Boxwood	Schaefferia frutescens	Plants	E	No	2
Florida Keys Nutrush	Scleria lithosperma	Plants	E	Yes[2]	N/A
Skullcap	Scutellaria havanensis	Plants	E	Yes[2]	N/A
Eaton's Spike-moss	Selaginella eatonii	Plants	E	Yes[2]	N/A
Bahama Senna	Senna mexicana var. chapmanii	Plants	T	Yes[2]	N/A
Everglades Greenbrier	Smilax coriacea	Plants	T	Yes[2]	N/A
Blodgett's Nightshade	Solanum donianum	Plants	T	Yes[2]	N/A
Everglades Key False Buttonweed	Spermacoce terminalis	Plants	T	Yes[2]	N/A
Costa Rican Ladiestresses	Spiranthes costaricensis	Plants	E	No	5
Lacelip Ladiestresses	Spiranthes laciniata	Plants	T	Yes[2]	N/A
Southern Ladiestresseees	Spiranthes torta	Plants	E	Yes[2]	N/A
Leafy-beaked Ladiestress	Stenorrhynchos lanceolatum var. paludicola	Plants	T	No	5
Glades Pencil Flower	Stylosanthes calcicola	Plants	E	Yes[2]	N/A
West Indian Mahogany	Swietenia mahagoni	Plants	T	No	5
Least Halberd Fern	Tectaria fimbriata	Plants	E	No	5
Broad Halberd Fern	Tectaria heracleifolia	Plants	T	No	5
Coral hoarypea	Tephrosia angustissima var. corallicola	Plants	E	No	2
Tetrazygia	Tetrazygia bicolor	Plants	T	Yes[2]	N/A
Abrupt-tipped Maiden Fern	Thelypteris augescens	Plants	T	No	5

State listed species considered for analysis in fire management plan (does not include state listed species included in Federally listed species table)					
Common Name	Scientific Name	Taxonomic group	State Status[1]	Retained for detailed analysis	Justification for excluding from detailed analysis[2]
Creeping Fern	Thelypteris reptans	Plants	E	No	5
Lattice-vein Fern	Thelypteris reticulata	Plants	E	No	5
Toothed Lattice-vein Fern	Thelypteris serrata	Plants	E	No	5
Thatch Palm	Thrinax radiata	Plants	E	No	2
Reflexed Wild-pine	Tillandsia balbisiana	Plants	T	No	5, 9
Cardinal Airplant	Tillandsia fasciculata var. clavispica	Plants	E	No	6
Cardinal Airplant	Tillandsia fasciculata var. densispica	Plants	E	No	5, 9
Twisted Airplant	Tillandsia flexuosa	Plants	T	No	5, 9
Giant Airplant	Tillandsia utriculata	Plants	E	No	5, 9
Leatherleaf Airplant	Tillandsia variabilis	Plants	T	No	5
Chiggery Grapes	Tournefortia hirsutissima	Plants	E	Yes[2]	N/A
Pineland Noseburn	Tragia saxicola	Plants	T	Yes[2]	N/A
West Indian Trema	Trema lamarckianum	Plants	E	Yes[2]	N/A
Mule-ear Orchid	Trichocentrum undulatum	Plants	E	No	2
Hoopvine	Trichostigma octandrum	Plants	E	No	2
Florida Gamagrass	Tripsacum floridanum	Plants	T	Yes[2]	N/A
Pearl-berry	Vallesia antillana	Plants	E	No	2
Wormvine Orchid	Vanilla barbellata	Plants	E	No	5
Mrs. Lott's vanilla	Vanilla dilloniana	Plants	E	No	6
Leafy Vanilla	Vanilla phaeantha	Plants	E	No	5
Blodgett's Ironweed	Vernonia blodgettii	Plants	E	Yes[2]	N/A
Ghost-plant	Voyria parasitica	Plants	E	No	5
mucha-gente	Xylosma buxifolia	Plants	E	Yes[2]	N/A
Coontie	Zamia pumila	Plants	CE	Yes[2]	N/A
State Status[1]: E=endangered T=threatened CE=commercially exploited					
Retained for detailed analysis:					
Yes[1]: State listed wading bird species analyzed as a group in the Fire Management Plan EA					
Yes[2]: State listed plant species that occur in fire dependent communities analyzed as a group in the Fire Management Plan EA					
Justification for excluding from analysis[2]:					

1. Does not occur in Everglades National Park				
2. Not known to occur in areas where prescribed fire will be implemented under either alternative				
3. Does not commonly occur in Everglades National Park				
4. Not known to occur in Everglades National Park				
5. Natural populations protected by mitigation to prevent burning hardwood hammocks where this species occurs or habitats otherwise do not burn				
6. Extirpated from ENP flora, occurred in communities where fire does not occur				
7. Location of population(s) unknown				
8. Not native, formerly cultivated plants extirpated				
9. Fire intolerant species that can occur in fire dependent communities but overall abundance and distribution indicates that population level effects will not occur under either alternative				

Other species of management concern considered for analysis in fire management plan/EA					
Common Name	**Scientific Name**	**Taxonomic group**	**State Status**	**Retained for detailed analysis**	**Justification for excluding from further analysis[1]**
Brown-Headed nuthatch	Sitta pusilla	Birds	Not listed	Yes	N/A
Eastern bluebird	Sialia sialis	Birds	Not listed	Yes	N/A
Florida wild turkey	Meleagris gallopavo osceola	Birds	Not listed	Yes	N/A
Eastern diamondback rattlesnake	Crotalus adamanteus	Reptiles	Not listed	Yes	N/A
Big sandbur	Cenchrus myosuroides	Plants	Not listed	No	1
Water horn fern	Ceratopteris pteridiodes	Plants	Not listed	No	1
Sand ticktrefoil	Desmodium lineatum	Plants	Not listed	Yes[1]	N/A
Simpson's cupgrass	Eriochloa michauxii var. simpsonii	Plants	Not listed	No	2
Purplehead sneezeweed	Helenium flexuosum	Plants	Not listed	Yes[1]	N/A
Bunch cutgrass	Leersia monandra	Plants	Not listed	No	2
Mexican sprangletop	Leptochloa fusca ssp. uninervia	Plants	Not listed	No	2
roadside leafbract	Malachra fasciata	Plants	Not listed	No	1
Heartleaf groundcherry	Physalis cordata	Plants	Not listed	No	1
Bog smartweed	Polygonum setaceum	Plants	Not listed	No	2
River sage	Salvia misella	Plants	Not listed	No	2
Hidden dropseed	Sporobolus compositus var. clandestinus	Plants	Not listed	Yes[1]	N/A
Coot Bay dancing lady orchid	Trichocentrum carthagenensis	Plants	Not listed	No	2
Retained for detailed analysis:					
Yes[1]: Species of management concern that occur in fire dependent communities analyzed as a group in the Fire Management Plan EA					
Justification for excluding from further analysis[1]					
1. Not known to occur in areas where prescribed fire will be implemented under either alternative					
2. Presumed extirpated from ENP flora					

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS / October 2014